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YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING **MONTANA** **NORTH DAKOTA**

FIFTY-SIXTH ANNUAL REPORT
2007

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Yellowstone River

Compact Commission

Fifty-Sixth Annual Report

2007

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[1]Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

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Conversion Factors

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	4,047	square meter (m^2)
acre	0.4047	hectare (ha)[1]
acre	0.4047	square hectometer (hm^2)
acre	0.004047	square kilometer (km^2)
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
cubic foot per second-/day (ft^3/s-day)	2,447	cubic meter (m^3)
cubic foot per second-/day (ft^3/s-day)	0.0002447	Cubic hectometer (hm^3)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
acre-foot (acre-ft)	0.000001233	cubic kilometer (km^3)
	Flow rate	
acre-foot per year (acre-ft/yr)	1,233	cubic meter per year (m^3/yr)
acre-foot per year (acre-ft/yr)	0.001233	cubic hectometer per year (hm^3/yr)
acre-foot per year (acre-ft/yr)	0.000001233	cubic kilometer per year (km^3/yr)
cubic foot per second (ft^3/s)	28.32	liter per second (L/s)
cubic foot per second (ft^3/s)	28.32	cubic decimeter per second (dm^3/s)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
feet per year (ft/yr)	0.3048	meter per year
gallons per minute (gal/min)	0.06309	liter per second

[1] The unit hectare is used with the International System of Units (SI), which is in common everyday use throughout the world. See: Taylor, B.E., and Thompson, Ambler, eds., 2008, The International System of Units (SI): U.S. Department of Commerce, NIST Special Publication 330, 92 p., available online at *http://physic.nist.gov/Pubs/SP330.pdf*

YELLOWSTONE RIVER COMPACT COMMISSION

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Honorable David Freudenthal
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Honorable Brian Schweitzer
Governor of the State of Montana
Helena, Montana 59620

Honorable John Hoeven
Governor of the State of North Dakota
Bismarck, North Dakota 58501

Dear Governors:

Pursuant to Article III of the Yellowstone River Compact, the Commission submits the following fifty-sixth annual report of activities for the period ending September 30, 2007.

Minutes of April 25, 2007

Members of the Yellowstone River Compact Commission convened the first of two meetings in 2007 on April 25 at 8:30 a.m. in Sheridan, Wyoming. In attendance were Mr. William Horak, U.S. Geological Survey (USGS), Chairman and Federal Representative; Ms. Mary Sexton, Director of Montana Department of Natural Resources and Conservation (DNRC) and acting Commissioner for Montana; and Mr. Patrick Tyrrell, Wyoming State Engineer and Commissioner for Wyoming. Also in attendance were Mr. Chuck Dalby, Mr. Kevin Smith, and Mr. Keith Kerbel, DNRC; Ms. Sarah Bond, Montana Attorney General's Office; Ms. Sue Lowry, Mr. Loren Smith, Mr. Mike Whitaker, Mr. Carmine LoGuidce, and Mr. Bill Knapp, Wyoming State Engineer's Office; Mr. Peter Michael, Wyoming Attorney General's Office; Mr. Christian Levine, Montana Department of Environmental Quality (DEQ); Mr. Jim Darling, Montana Department of Fish, Wildlife and Parks; Mr. John Wheaton, Montana Bureau of Mines and Geology (MBMG); Mr. Art Hayes, Tongue River Water Users Association; Mr. Doyl Fritz, WWC Engineering; Mr. Douglas Davis, Bureau of Indian Affairs; Mr. Patrick Erger, Bureau of Reclamation; and Mr. Myron Brooks and Mr. Wayne Berkas, USGS.

Mr. Horak called the meeting to order. All attendees introduced themselves.

Mr. Horak noted that the minutes for the December 6, 2006 meeting have not been accepted by the two Commissioners and that correspondence has taken place between the two Commissioners and the recording secretary (Mr. Berkas). Mr. Horak asked if the two Commissioners were satisfied with the present condition of the minutes.

Ms. Sexton replied, yes, providing the link to the feasibility study was included in the minutes.

Mr. Berkas replied that the link will be in the minutes.

Ms. Sexton and Mr. Tyrrell replied they were satisfied with the latest version of the December 6, 2006 minutes.

Mr. Horak made a point of clarification regarding why there was not an agenda item on approving the December 6, 2006, meeting minutes. Normally, the previous-year Yellowstone River Compact Commission annual report would be published and distributed prior to the spring meeting. Thus, the minutes for the December meeting would have been approved through a series of e-mails and/or off-line communications.

Ms. Sexton acknowledged Mr. Horak's explanation of why there was not an agenda item to approve of the December 6, 2006 minutes and the 2006 report. She noted that at this time the 2006 report is not complete and asked if the Commissioners could have an update on the status of the annual report.

Mr. Horak asked Mr. Berkas to update the Commissioners on the status of the 2006 Yellowstone River Compact Commission report.

Mr. Berkas replied that he gave each commissioner a draft of the report containing the changes identified from the December 6, 2006 distribution. The draft does not contain figures 1 through 4 because they are still with the illustrator.

Ms. Sexton asked if there would be a formal adoption of the report at this meeting if the report were complete.

Mr. Horak replied that normally there is no specific declaration of adopting the report. The adoption process usually is implied through communications with the Commissioners and the USGS. He asked if the process is acceptable to the two Commissioners.

Mr. Tyrrell replied that the report is the product of the minutes that the Commissioners approve and the Federal members (USGS) put the report together and present the report to the Commission. The Commissioners get to look at the report and comment on the final version. He did not remember a formal adoption of the report.

Ms. Sexton asked if the report was adopted during the spring meeting, or is the report completed after the spring meeting minutes are completed.

Mr. Horak replied that the operating rules adopted by the three Commissioners in the 1980s stated that the report would be completed by a specific date. That date has not always been met for various reasons, but almost always the report has been finished, bound, and distributed before the spring meeting. If it were desirable, we (the three Commissioners) could declare that the minutes are complete and accepted, and ready to be incorporated and published in the annual report. That process normally would occur in January or February, well before the spring meeting. If so desired, the record could show that we adopt the process of approving the minutes and report through e-mail and/or off-line conversations by January or February and that at the end of the process, the report is considered accepted.

Ms. Sexton thanked Mr. Horak for the clarification because she was not clear regarding the process of approving the minutes and the report. She said that an explicit declaration would be helpful.

Mr. Horak replied that they could codify the discussion by making it a motion. The motion would be that the process of the Commissioners reviewing and accepting the previous year's data, the narrative portion of the report, and the minutes constitutes an acceptance of the annual report, and this process will be completed by the end of January or early February.

Ms. Sexton said that she would make that motion. Mr. Tyrrell seconded the motion. There was no discussion.

The motion passed.

Mr. Horak asked if there was additional discussion regarding the 2006 Yellowstone River Compact Commission report.

Ms. Sexton asked if the priority date for the Tongue River Reservoir was corrected.

Mr. Berkas replied that it had been changed even though her copy of the report showed an inked correction. A comment that has not been addressed is the labeling of reservoirs on the map in the report. Currently, the streamflow stations are described in the "Explanation" as "Compact Streamflow-Gaging Station" and some reservoirs are identified in the "Explanation" as "Compact Reservoir-Content Station." Previously, Mr. Dalby suggested that all reservoirs be identified the same way for consistency reasons. Mr. Berkas noted that there are two types of reservoirs presented in the report. Month-end contents of seven reservoirs are presented in the report and are identified on the map as "Compact Reservoir-Content Station." Year-end contents of an additional 23 reservoirs also are presented in the report, but are not identified in the "Explanation" of the map. Mr. Berkas suggested that a way to alleviate the confusion would be to change the "Compact Reservoir-Content Station" to "Month-End-Content Station."

Mr. Tyrrell replied that he preferred to leave them as reservoirs.

Ms. Sexton asked for more clarification on the difference between the month-end reservoirs and the year-end reservoirs.

Mr. Berkas replied that six of the month-end reservoirs are operated by the Bureau of Reclamation and one of the reservoirs is operated by Montana Department of Natural Resources and Conservation. The month-end reservoirs have a gage located on the reservoir that is read continuously or at least monthly, and the gage has been assigned a USGS gage number that is listed on the map. These seven reservoirs have been referred to as "Compact Reservoirs" for the last couple of years in the annual report. The other 23 year-end reservoirs are State, local, or private reservoirs located in Wyoming. These reservoirs have gages that are read at least on September 30 each year. These reservoir gages do not have a USGS gage number. The contents of all the reservoirs are provided to the USGS by the operator of the reservoir to be included in the annual report.

Ms. Bond stated that she believed that there has not been a formal designation of the term "Compact Reservoir" and thought the two States would disagree. She proposed to not make any changes and let the courts decide what to call the reservoirs.

Mr. Tyrrell replied that there are no "Compact Reservoirs." It is not a defined term. It is a term-of-art that we have used that has flowed into some of the reporting. Reservoirs are not listed in the Compact. The term "Compact Reservoir" is not used and the term is not defined. The term implies that these reservoirs are somehow different than other reservoirs or they have some special standing in the Compact, when in fact they are just in the basin. So, using the term "Compact Reservoir" may have been a mistake.

Ms. Bond replied that Montana agrees that there has not been a formal definition of a "Compact Reservoir." It is doubtful that the Commissioners will agree on what constitutes a "Compact Reservoir." Rather than change something, Montana feels the Supreme Court will make the decision.

Mr. Berkas replied that he would not make any changes.

Mr. Tyrrell asked if the Commissioners were approving the 2006 Yellowstone River Compact Commission report.

Mr. Horak replied that there is no consequence for being late, but we do have an obligation to be timely. Is there any reason why the Commissioners can not approve the report.

Ms. Sexton replied that Montana would like another week to review the report.

Mr. Berkas asked if the two Commissioners could get final comments to him through e-mail by May 4, 2007. If he did not receive a reply, he would assume there were no corrections. After he received the corrections, he would submit the report to the publications unit to be published.

Mr. Horak requested that all changes be shared with the other Commissioner.

Mr. Horak asked Mr. Berkas to discuss the budget.

Mr. Berkas reminded the Commissioners that they requested a verbatim transcript of the minutes, a copy of the tape recording of the minutes, and a condensed paraphrased version of the minutes. Mr. Berkas did not have enough information to determine if the change from the traditional product warranted an increase in cost. Also, because the States are working on a 2-year budgeting cycle, the cost listed in the draft 2006 report for 2008 will not change. The total 2008 cost is $84,000, with the States responsible for $21,000 and the USGS responsible for $42,000. The total cost for 2009 is proposed at $88,200 and the total cost for 2010 is proposed at $92,600. The proposed cost for 2009 and 2010 are indexed by 5 percent to give a guidance of possible cost increase, and this cost probably will change.

Mr. Horak asked if the 2009 costs could change by the December 2007 meeting.

Mr. Berkas replied that the 2009 costs probably would change as he better understood the amount of effort required to produce the meeting minutes.

Mr. Tyrrell said that Wyoming will soon enter their 2-year budget cycle (2009-10) and would like a good estimate of 2009 costs.

Mr. Berkas replied that he would guarantee that the 2009 costs will not exceed $89,000.

Mr. Horak expressed concern that the time required by the recording secretary will increase due to the additional demands of producing a more detailed version of the minutes than in the past. Mr. Horak felt that the additional time would warrant a more than a 5-percent increase in cost. Mr. Horak then asked for additional discussion.

Mr. Berkas replied that he felt that he would become more efficient with producing the minutes because he now better understands the level of detail desired by the Commissioners. He will be keeping track of the time and cost, and if additional funds are needed, those funds will be requested in the 2010 budget. The Commission will get the product now, but they will pay for it later.

Mr. Horak directed the Commission discussions toward a summary of the Yellowstone River Compact Technical Committee meeting held on the previous day (April 24, 2007). Mr. Horak acknowledged that the Technical Committee members did not complete their discussions and would cover the remaining discussions at this meeting. He then asked Ms. Lowry to give a summary of the Technical Committee meeting.

Ms. Lowry briefed the Commission on the discussions during the Technical Committee meeting (minutes appended). She offered the following highlights:

Streamflow forecasts:

The Powder River is expected to flow at 63 percent of average;

The Tongue River is expected to flow at near average; and

The Bighorn River at the State line is expected to flow at 60 percent of average.

The Bureau of Reclamation projects Buffalo Bill Reservoir inflows at 66 percent of average and Boysen Reservoir inflows are projected at 54 percent of average.

Mr. Bruce Yates from Sheridan County in Wyoming gave a presentation on ownership and operation of Lake DeSmet. He described projected development of subdivisions around the lake, and some potential energy development.

Mr. John Lawson, Bureau of Reclamation, Area Office Manager, Mills, Wyo., gave a presentation on the operation of Buffalo Bill and Boysen Reservoirs.

Mr. Steve Gray, Wyoming State Climatologist, presented current weather information. Also, he compared the current drought to historical records created from tree ring studies. Historical records indicate that droughts longer than our current drought have occurred in the area.

Mr. John Wheaton, MBMG, gave a presentation on ground-water monitoring in the coal-bed methane area of the Tongue and Powder River basins.

Ms. Lowry asked Mr. Brooks to present the Technical Committee's discussion on indicator gages.

Mr. Brooks said the credit for the work on indicator gages goes to Mr. Kirk Miller, USGS, who could not attend the meetings. During the last Commission meeting, the Commissioners asked the Technical Committee to look at the feasibility of identifying a few long-term gages that could be used as indicator stations for conditions in the basins and various subbasins. Seven stations in the headwaters of the basins were chosen based upon length of record and minimizing diversions. All gages are USGS year-round stations that are transmitting real-time data. The commissioners were given handouts with two graphs per each indicator gage. One graph displayed boxplots of monthly and annual streamflow statistics. The other graph showed the annual departure from the average annual flow for the period of record. These are the same type of plots displayed in the annual report.

Mr. Brooks asked the Commissioners to give the Technical Committee a charge so they could better refine the gage network.

Mr. Tyrrell replied that the reason the Commissioners asked the Technical Committee to investigate indicator gages is that at times when there is little flow in the rivers in Wyoming and Montana, is it due to depletions or because there is low supply at the headwaters. The thought was to establish a few sites upstream from the first diversions to indicate whether the water supply is good or bad. He thought the Technical Committee did a good job of identifying the correct gages, and this is a good starting point.

Ms. Sexton agreed that the selected gages are a good start. Mr. Dalby liked that the gage on the Yellowstone River at Corwin Springs was selected. Although the drainage is outside the Compact area, the gage measures the flow coming from Yellowstone National Park and would be a good indicator of natural conditions. He agreed with Mr. Tyrrell that gages are needed in the headwaters to reflect runoff from snow and rain that is not affected by man, because those types of gages reflect natural trends and severity of drought. He also proposed to include the State line gages on the Tongue River (Tongue River at State line, near Decker, MT – 06306300) and the Powder River (Powder River at Moorhead – 06324500) because those two gages are used extensively by water users and water managers in Wyoming and Montana. These gages are indicators of water availability in Montana.

Mr. Tyrrell asked what should be done with the indicator gage information. Should the data be published in the annual report.

Ms. Lowry replied that the Technical Committee did not discuss data presentation. Now that the Technical Committee has better clarification, the Technical Committee can meet and do some comparisons between headwater and downstream sites and comparisons between basins. Rather than publishing numbers in a report, it would be better to first analyze the numbers to determine how best to present the data to tell a meaningful story.

Ms. Sexton asked if the analysis would take the form of a discussion at the Technical Committee meeting.

Ms. Lowry said that that could be possible but there needs to be a lot of discussion before the meeting as well.

Mr. Kerbel suggested that the Commissioners give the charge to form a working group that would meet and discuss the indicator gages and to come to a consensus on the indicator gages.

Ms. Sexton asked how the working group would be comprised and to whom would they report.

Ms. Lowry replied that the members probably would be members from each State and the USGS. They would communicate informally through e-mails and phone conversations. There would be a need to have a day long

meeting, perhaps in October, to agree on a presentation. The final presentation would be to the Technical Committee before the Commission meeting in December.

Mr. Horak asked for consensus that Ms. Lowry and Mr. Kerbel put together a working group, and that the working group report to the Technical Committee prior to the December Commission meeting. Ms. Sexton and Mr. Tyrrell agreed.

Mr. Erger asked if Ms. Lowry had received a copy of John Lawson's PowerPoint; she indicated that Mr. Lawson assured her he would e-mail it to her for posting on the Compact Web site. Mr. Horak said that there would be a discussion of posting material on the internet Web site at the end of the agenda.

Mr. Horak asked Wyoming to address the number of and output from existing coal-bed methane wells.

Mr. Tyrrell handed out a graph showing the number of applications for coal-bed methane wells from January 1997 through February 2007. There have been a total of 39,126 applications for coal-bed methane wells over that time period. This listing is for the whole State of Wyoming, but most of the applications come from the Powder River Basin (geologic).

Mr. Tyrrell also handed out a table listing the number of temporary filings and permitted reservoirs for coal-bed methane in the Tongue, Little Powder and Powder River drainages. There are a total of 74 temporary filings and 208 permitted reservoirs in the Tongue River Basin; 69 temporary filings and 407 permitted reservoirs in the Little Powder River Basin; and 403 temporary filings and 2,404 permitted reservoirs in the Powder River Basin. There are a total of 546 temporary filings and a total of 3,019 reservoirs in the three basins. Temporary filings are applications that have yet to advance to a permit. The total temporary filings comprise a storage of 10,928 acre-ft. The total permits comprise a storage of 40,249 acre-ft, an average of about 13 acre-ft per reservoir.

The Wyoming State Engineer's office does not keep track of water produced from the wells. Wyoming Oil and Gas Commission posts those numbers on their Web site (*http://wogcc.state.wy.us/*).

Mr. Horak asked how many of the permitted wells are actually producing.

Mr. Tyrrell said he believed that the number of producing wells in the Powder River Basin (geologic) are between 14,000 and 15,000. Some of the permitted wells are no longer producing, some have been shut down, and some were never drilled. The total number of producing wells can be confirmed on the Wyoming Oil and Gas Commission Web site.

Mr. Kerbel asked if there is a slowdown in applications.

Mr. Tyrrell replied that the applications for wells have slowed. Generally, the numbers of received applications are a function of the ability to get a discharge permit, the price of natural gas (methane), and Federal permitting. For example, when the BLM completed their Environmental Impact Statement (EIS) in Wyoming, large tracts opened for coal-bed methane production and a corresponding increase in applications was seen by the SEO.

Mr. Horak asked Montana to comment on coal-bed methane development in Montana.

Mr. Levine stated that Montana basically has three permitted coal-bed methane discharges. One is untreated and two are treated. He thought the number of permitted wells in Montana ranged from 1,200 to 1,500 wells and about 1,000 wells are producing water. There is an EIS in the comment phase. When the EIS is approved, Montana expects to see an increase in permit requests. The EIS covers the land under Bureau of Land Management (BLM) control.

Currently, all the coal-bed methane development in Montana is on private or State-owned mineral leases.

There is some interest in putting in developments using ponds and reservoirs for water management of coal-bed methane produced water. At this time, there has been no application for this process.

Ms. Lowry asked if Montana went to ponds and reservoirs, would those impoundments be permitted.

Ms. Sexton replied that it depended upon the beneficial use identified in the application. If the pond were to extend past the life of the energy permit, it would have to be permitted. Mr. Kerbel added if the land owner had an existing stock-water right, nothing need be done. Ms. Bond added that there is some current legislation (SB 407) if passed, will address the ability to discharge into existing stock ponds. Mr. Levine added that the bill allows for discharge of coal-bed methane water for 180 days to supplement livestock watering during drought periods.

Mr. Horak asked Wyoming to comment on disposing of coal-bed methane produced water.

Mr. Tyrrell reported that he had no new news except that he heard that some areas that are no longer producing gas are being targeted for reinjection of coal-bed methane water.

Mr. Levine reported that a producer in Montana is considering reinjecting coal-bed methane water into a dry coal seam above the gas-producing coal seam.

Mr. Horak asked Wyoming if there were any ongoing monitoring activities or studies.

Mr. Tyrell reported that the Wyoming State Engineer's Office is working with the Wyoming Geological Survey to develop a potentiometric-surface map of the coal areas. The intent is to produce a tool for the State's ground-water managers. The project is in the early stages.

Mr. Tyrrell reported that the Wyoming Coal Bed Natural Gas Water Management Task Force is nearing the end of its life. They should have some recommendations in September 2007.

Mr. Brooks provided information about work the USGS is doing in cooperation with Wyoming DEQ. The USGS is operating approximately 30 water-quality monitoring sites in northeast Wyoming. Some of the sites are associated with continuous discharge monitoring and those sites have real-time display of water-quality constituents. The network has operated for about 3 years. A report describing comparisons between the recent and past data is expected to be published this summer.

The USGS also has been collaborating with BLM and Wyoming Game and Fish with site habitat monitoring and fish community monitoring at various locations in the Powder River Basin. A report on this effort will be published in early 2008. The focus of the study is on how native fish communities are adapting to intermittent flows, high water temperatures, and decreased oxygen. Wyoming DEQ is considering putting treated coal-bed methane water into the Powder River. Wyoming Game and Fish is concerned that good-quality treated water may provide opportunities for non-native fish species to out compete the native species.

Mr. Horak asked Mr. Tyrrell to update the Commission on the progress of the proposed pipeline to transport water from the Powder River Basin to the Platte River Basin.

Mr. Tyrell stated that the most recent information he has is the Wyoming Pipeline Authority issued an open season to invite interest from companies to get involved with a pipeline. There has been little interest. The pipeline requires a commitment of a volume of water for a period of time. As water production declines as gas is produced, committing a specific volume of water may be problematic. It appears to be a scary proposition for the industry to make the commitment and that may be why there has not been much interest.

Ms. Bond said she recalled that the Wyoming Legislature appropriated some money to investigate the feasibility of the pipeline.

Mr. Tyrrell replied that about a year ago, $500,000 was appropriated to the Water Development Commission to do a feasibility study.

Ms. Bond replied that she also understood that Anadarko built their own pipeline to dispose of coal-bed methane water. Where is that water going?

Mr. Tyrrell replied that last year Anadarko built a pipeline to dispose of water into their Salt Creek oil field, an area in the Powder River drainage.

Mr. Horak asked Wyoming to address the topic of pending water-quality numeric rules.

Mr. Tyrrell replied that there is a proposal that Wyoming's Environmental Quality Council put forth that would regulate the quantity of coal-bed methane produced water without respect to quality (Chapter 2 of the rules). As of yesterday (April 24, 2007), the Governor elected not to sign the Chapter 2 rules. Another chapter deals with agricultural use policies. Mr. Tyrrell is not sure if the Governor will sign those rules.

Mr. Horak asked Mr. Wheaton (MBMG) to provide a summary of the presentation he gave at the Technical Committee meeting yesterday regarding ground-water monitoring in the area being developed for coal-bed methane.

Mr. Wheaton started his summary by stating that the ground water and surface water are connected. Essentially, the water is the same, it is just a matter of timing as the water flows through the system.

The geologic Powder River Basin decreases in thickness northward toward the Yellowstone River. The deep coal beds in Wyoming become shallower in Montana and eventually crop out in Montana. Water recharges the coal seams around the edges of the basin in Wyoming and Montana. The ground water moves northward through the coal seams toward Montana and discharges to rivers, and springs, or evaporates as it slowly seeps out of the coal beds. Some water can move through the confining layers to other more permeable coal beds.

The MBMG monitors wells in Montana to determine the effects that coal-bed methane development has on ground-water levels and ground-water movement. MBMG produces a report about the monitoring program each year. Other agencies (BLM and Wyoming Geological Survey) are monitoring ground water and an interagency working group is attempting to bring together the results of all monitoring. It is doubtful there will be a single report, rather several reports that have similar layouts.

Mr. Tyrrell asked if Mr. Wheaton (MBMG) could determine the amount of water flowing in the rivers due to ground-water discharge compared to snow-melt and rainfall runoff.

Mr. Wheaton replied that the base flow of any river is ground-water discharge, and investigations of gains or losses would be needed to show the amount of ground-water discharge.

Mr. Tyrrell replied that the geographic boundary of the Powder River Basin (geologic) extends south of the topographic boundary of the Powder and Tongue River Basins. Some of the recharge to the Powder River Basin (geologic) comes from the North Platte River Basin. How much of the flow in the rivers of Montana comes from water moving from Wyoming to Montana compared to ground water from other sources is difficult to determine.

Mr. Wheaton replied that contributing to the difficulty is quantifying the amount of recharge that is occurring. We know that there are areas in Montana (the Wolf Mountains) and Wyoming that recharge the aquifers, but we do not know the percent of recharge that comes from each area.

Mr. Horak asked if recharge could be quantified using modern technology.

Mr. Wheaton replied that the system could be modeled, but the model would have to be much simpler than the existing geology. The model could be used to indicate where to look for recharge. A great deal of ground-truthing would need to be done.

Mr. LoGuidce asked if MBMG will monitor wells north of the State line to determine if the decrease in ground-water level observed at the State line will affect the amount of water discharging from the coal seams.

Mr. Wheaton replied that the geology is complicated. Let us pretend that we have 20 coal seams and 20 sandstone layers, where the topography intersects each layer, a spring or seep occurs. At the bottom of the layers is the Lebo Shale, an impervious layer that crops out north of Brandenberg. Most of the water in the system has left before the

Lebo Shale crops out. The monitoring program consists of about 230 wells and 25 springs from the State line to where the Lebo Shale crops out. Some of the wells have been monitored from the 1970s to present. Thus, MBMG has some long-term reference on ground-water levels.

Mr. LoGuidce asked if Mr. Wheaton has noticed any trend in the discharge from the springs.

Mr. Wheaton replied that he has not observed any reduction of flow, nor would he expect to see a reduction in flow. The ground water moves at a slow rate, about 10 ft/yr, and it will take a long time before the effect of the reduced ground-water levels is noticed at the springs.

Mr. LoGuidce asked how much the ground-water levels declined at the State line.

Mr. Wheaton replied that MBMG has monitored about a 20-ft decline in ground-water levels in the coal aquifers on the Montana side of the State line at about a distance of about 1.5 mi from coal-bed methane production.

Mr. Horak asked Mr. Tyrrell to comment on the joint water-use study proposed by Wyoming.

Mr. Tyrrell replied that given the current situation with lawsuits, the money set aside for the study has to go toward the lawsuit defense.

Mr. Horak asked Mr. Tyrrell and Ms. Sexton to update the Commission on current legislation that may be of interest to the other State.

Mr. Tyrrell stated that there were two bills that may be of interest. One bill dealt with rulemaking authority for the Wyoming State Engineer. The bill would provide an umbrella statement clarifying rulemaking authorities. Unfortunately, the bill did not make it through the session, but Mr. Tyrrell hopes to bring it back, and soon it will come out of the interim committee.

The other bill deals with the authority to license water-well drillers' authorities. Unfortunately, the bill was vetoed because of a wording problem defining "contractor." The bill will be brought back and hopefully passed.

A bill also passed that made some fairly major revisions to Wyoming's eminent domain law. As eminent domain condemnations were utilized by the coal-bed methane industry, many landowners felt they didn't have sufficient protections or voice in the process. The revised law establishes requirements that the condemning party must abide by and gives more notice to the private-property owner prior to condemnation proceeding.

Ms. Sexton replied that in Montana, House Bill 304 is working its way through the House and the Senate. The bill would reestablish an interim water-policy committee. The committee will look at ground-water and surface-water issues and relations, effects of increased residential development on water, drought, and other issues related to water.

House Bill 831 deals with ground water in closed basins. The bill addresses augmentation and aquifer storage for mitigating adverse effects in closed basins.

House Bill 97 provides for an interim study dealing with surface rights on coal-bed methane production land. The bill would extend the amount of time the surface-right owner has to reach an agreement with the coal-bed methane operator.

There was some legislation that improves the statute on controlled ground-water areas.

Mr. Horak asked Mr. Kerbel to brief the Commission on Bighorn Basin water-supply issues and summarize Mr. John Lawson's presentation to the Yellowstone River Compact Technical Committee.

Mr. Kerbel replied that according to Mr. Lawson's presentation, the projected release for 2007 from Boysen Reservoir is 300,000 acre-ft and the projected release from Buffalo Bill Reservoir is 425,000 acre-ft. The snowpack in the area feeding the two reservoirs is less than 50 percent of normal at this time.

Mr. Kerbel added that Buffalo Bill reservoir was raised about 25 ft. in the early 1980s to offset silt accumulation and to increase storage. The storage was increased by 190,000 acre-ft, and this additional storage is owned by the State of Wyoming and has a 1980 water right. During the winter, the first 50 ft3/s of released water comes out of the Federal share of the stored water and the additional water comes from the State share of the stored water.

Mr. Kerbel reported that there were two meetings of the Bighorn Lake Long Range Management Working Group, formed by Mr. Duberstein of the U.S. Bureau of Reclamation, so far this year; one meeting was in Powell and the other in Fort Smith. The working group consists of agency personnel, county commissioners, representatives of the congressional delegation, and private citizens. Thus far, the meetings consisted of discussing the operation of the project and the various operational issues. The intent is to discuss a long-term plan for operation that maintains acceptable lake elevations and streamflows from Yellowtail Dam. In addition, some members want to discuss recreational issues, such as building a highway from Lovell to Fort Smith.

Mr. Kerbel expressed his opinion after visiting the Bighorn River downstream from the afterbay, with the reduced releases of only 1,500 ft3/s from Yellowtail Dam, there is not enough water to allow fish to spawn by entering side channels. Without water in the side channels, the juvenile fish will be susceptible to predation.

Ms. Sexton asked Mr. Darling to comment on the fishery situation in the Bighorn River downstream from Yellowtail Dam (Bighorn Lake).

Mr. Darling replied that with the 7-plus years of drought, there appears to be a dramatic change in the operation of Yellowtail Dam. In past drought situations, more water was released to the Bighorn River. The Bureau of Reclamation (BOR) has a lot of interests to balance, but their decision to release 1,500 ft3/s during the spring rainbow trout spawn has had a dramatic effect on the numbers of fish that survive each year. Studies over the years show an impact on the rainbow trout fishery. Without water in the side channels to provide habitat for spawning and rearing, the new trout do not stand much of a chance with bigger fish.

Mr. Whitaker asked if any work is being done on the spawning beds during the low-flow situation.

Mr. Darling replied that mechanical modification of the streambed is something to look at but that fix could cause bigger long-term problems.

Mr. Horak asked the two Commissioners to comment on drought planning.

Mr. Tyrrell replied that Wyoming has a drought task force. The task force serves as a clearing house for information on the drought. At the meetings, there are presentations on how the drought affects streamflow, reservoirs, and agriculture. The task force provides information on Federal programs and how to plan for the drought. The Wyoming State Engineer has issued a couple of memos in the past on emergency stock-water use and emergency water for firefighting. The memos probably will be issued again this year.

Ms. Sexton replied that Montana has a drought committee that has been in existence for many years. The committee does not have enforcement elements. Their main purpose is to provide information and help with drought designations and declarations in the Federal process.

Ms. Sexton asked Ms. Bond if she wanted to comment on U. S. Environmental Protection Agency (EPA) water-quality issues. Ms. Bond indicated that Montana and Wyoming were in litigation, as well as mediation with respect to water-quality issues, but she would answer questions if anyone had them (there were none).

Mr. Horak asked Ms. Sexton to provide an update on Montana's statewide adjudication.

Ms. Sexton replied that previously there was a water tax that provided revenue to fund the statewide adjudication. Every 2 years, a water right was assessed $20, and this accounted for about $6,000,000. Because Montana had a surplus in the general fund, many politicians felt it best to fund the adjudication out of the general fund rather then assessing a water right. As a result, a bill was passed to fund the adjudication effort out of the general fund.

The Powder River has been adjudicated. The examination on the lower Tongue River is complete and a report is being prepared for the water court. The examination on the upper Tongue River is about 50 percent complete, and the Bighorn River is about 97 percent complete.

Ms. Bond reminded the Commissioners that the Tongue River is being administered based on the 1914 Miles City Decree, which is the final and enforceable decree used by water commissioners.

Mr. Horak asked Ms. Sexton to update the Commission of the Crow Compact.

Ms. Sexton replied that Senator Baucus (Montana) has the Compact and is expected to introduce legislation to approve the Compact this spring.

Mr. Kerbel added that after the Compact is ratified by Congress, it goes to the Crow Tribe to be ratified and then it goes to the Montana water court.

Mr. Horak announced that the Yellowstone River Compact Commission Web site is operating at *http://yrcc.usgs.gov* and encouraged all to view the Web site. Thus far, only the 2005 Yellowstone River Compact Commission report is posted on the Web site. All the reports after 2005 will be posted. As resources become available, past reports will be posted.

Mr. Horak proposed to have the Yellowstone River Compact Commission Web site be the official archive of the records of the Commission. It is the intent of the USGS to maintain the Web site forever. The Web site is on three redundant servers that are backed up daily. It is part of the mission of the USGS to maintain information and provide that information to the public, and the Web site falls under that category.

Ms. Sexton responded that having a Web-based archive is positive, but she did not now have all the reports. Who has all the records? How accessible are the records? Does someone have copies of all the annual reports warehoused somewhere?

Mr. Horak replied that he (the Commission Chairman) and Mr. Berkas (the recording secretary) have a separate set of records in their office. After 1951, the Montana USGS office provided the recording secretary and they have their set of records. Mr. Horak has the files maintained by the Commission Chairman.

Ms. Sexton asked if the files are in a paper format and/or microfilmed. She was concerned with the longevity of the files.

Mr. Berkas replied that his information is in folders in a filing cabinet. Nothing is microfilmed. He has a set of records from R.J. Newell, the Federal representative (from the Bureau of Reclamation) for the completion of the 1950 Compact.

Mr. Horak replied that in the 56-year history of the Compact, there probably have been 15 to 20 Federal representatives, and as many secretaries that were USGS employees. The information retained from year to year is variable depending upon the person filing the information.

Mr. Horak stated that after reading historical information on the operational rules of record, the duties of the secretarial service are not well defined. Also, the official record of the Commission is not well defined. He proposed that the USGS could organize the files and convert the records to an electronic form. It would be time consuming and it may be expensive to have all the documents scanned. He asked the Commissioners if this is something they would consider.

Mr. Horak added that if the Web site were to be the permanent archive, the electronic documents might need to be 508 compliant (a web requirement for vision impaired).

Mr. Dalby asked if all information on the Web site had to be 508 compliant. He also asked what type of metadata requirements there were for map and other data posted on the USGS Web site.

Mr. Horak said that he was not sure. He would have to check with the USGS policy regarding posting information on USGS Web sites.

Ms. Sexton commented that there appear to be two issues. One is how we archive and organize the past information, and the other is how we make the information publicly accessible on a Web site. She asked if the USGS could present the various options at the next meeting.

Mr. Horak agreed with Ms. Sexton and added that the USGS needed to complete an inventory of all the Compact information filed in their offices.

Mr. Tyrrell added that there needs to be some time between when the Commissioners agree to do the archiving and when the archiving is started. If the cost is great, the two States need some time to incorporate the additional cost in their budgets. Both States operate under a 2-year budget.

Ms. Bond replied that what is probably most important regarding an archive is to have a repository of all the annual reports. The Commissioners would leave it to the USGS to advise them of the effort required to produce electronic documents that meets the USGS policy regarding public accessibility. Each State has their own method of determining what is important and that information is archived within their Historical Society.

Mr. Horak replied that it would not be difficult to obtain a complete set of reports to be scanned into an electronic document. He said that he would determine the effort required to post those documents on the Yellowstone River Compact Commission Web site and have a presentation at the next meeting. He said that he would contact the two Commissioners asking for an inventory of Compact information. He asked the two Commissioners if this was agreeable.

Both Commissioners felt that a full inventory may be problematic. They both felt that the highest priority is having a complete set of the annual reports.

Ms. Sexton asked if the USGS would continue providing a tape recording copy of the minutes, a verbatim transcript of the minutes, and a paraphrased version of the minutes.

Mr. Berkas replied that at the December 6, 2006 meeting, the Commissioners decided to have the USGS provide a tape recording copy of the minutes and a verbatim transcript of the minutes, along with the usual minutes at the April 25, 2007 meeting. At the April 2007 meeting, the Commissioners would decide to continue with the new procedure, or go back to the old procedure.

Ms. Sexton replied that she liked the current procedure and made the motion that the USGS provide a tape recording copy of the minutes, a verbatim transcript of the minutes, and a paraphrased version of the minutes, and that this continue into the future. Mr. Tyrrell seconded the motion.

Mr. Tyrrell asked if the new process was affordable.

Mr. Berkas replied that the reporter works by the hour. Thus, the longer the meeting, the greater the cost. Based on the December 2006 meeting, the additional cost is not outrageous and can be incorporated into the USGS budget for the meetings. If the meetings were to last longer or the Commission were to meet more than 2 times a year, the USGS would ask for additional funding.

Mr. Horak stated the motion on the floor is the policy of recording and reporting the minutes, that is the USGS will produce a tape recording of the proceedings of the meeting, a verbatim transcript of the proceedings, and a draft document of the condensed version of the minutes. These products will be delivered to the two Commissioners. The USGS will not keep or store a copy of the tape recording of the proceedings. The motion carried.

Ms. Lowry stated that the minutes for the technical meeting have not always been included in the annual report. Should the technical meeting minutes be included in the annual report?

Both Commissioners agreed that the technical meeting minutes be included in the annual report.

Mr. Tyrrell asked that for procedural reasons that there be a deadline for changing the agenda. If changes are made too close to the meeting date, it becomes difficult to prepare for the new agenda item. He suggested 2 weeks prior to the meeting. Also, he suggested to not have a potpourri section in the agenda where an issue may arise that a State may be unprepared to discuss.

Ms. Sexton replied that she did not receive the original mailing of the agenda. She received the agenda 2 weeks later; thus, her request for a new agenda item was less than 2 weeks prior to the meeting.

Mr. Horak acknowledged that for some unknown reason Ms. Sexton did not receive his original e-mail of the agenda. He then replied that as he understands Mr. Tyrrell's request, if the Commissioners agreed to finalizing the agenda 2 weeks prior to the meeting there would be no need for a potpourri section in the agenda.

Mr. Tyrrell replied that the Commissioners would be better prepared for the meeting if they knew the agenda would not change at the last minute.

Ms. Sexton commented that a new agenda item should be specific. For example, if a presentation is requested, then the person doing the presentation should be identified.

Mr. Tyrrell agreed and added that if one State requests a presentation from another State, the request should be done months before the meeting because the individual making the presentation may have other commitments.

Ms. Sexton requested that new agenda items be added, providing there was mutual consent with the Commissioners. There may be some last minute information (such as State or Federal legislation) that may be noteworthy to the Commissioners. She also requested that the draft agenda be sent out 6 weeks prior to the meeting to give the Commissioners more time to organize and make additions to the agenda.

Mr. Tyrrell agreed with Ms. Sexton's request.

Mr. Horak made a motion to amend the procedures put in place more than a year ago:

1. The first draft of the agenda will be e-mailed to the Commissioners more than 6 weeks prior to the meeting.
2. The final agenda will be distributed more than 2 weeks prior to the meeting.
3. Only mutually agreed upon changes to the agenda will be accepted to the agenda less than 2 weeks prior to the meeting.

The motion was seconded and passed.

Mr. Horak asked if there were any items from yesterday's Yellowstone River Compact Technical meeting.

Ms. Lowy replied that Mr. Dalby composed a letter to Senators Baucus and Tester, and Representative Rehberg for the Commissioners to sign asking for continued support of the Tongue River Monitoring Network. She then asked if the USGS could provide an update on the monitoring program in light of the Federal "Continuing Resolution" and possible funding reductions.

Mr. Berkas replied that the program consists of collecting streamflow and water-quality information from 12 sites in the Tongue River drainage. Three sites are in Wyoming and the other nine sites are in Montana. The USGS received a portion of the original earmark. Because funding was reduced, the decision was made to continue sampling at all sites, but at a reduced frequency. Sampling at the mainstem sites was reduced from 18 samples per year to 12 samples per year. Sampling at the tributary sites remained at 12 samples per year.

At this time, the USGS has not heard if there will be any Federal funding (earmark) to continue the monitoring in 2008. A large part of funding support for the network comes from other agencies.

Mr. Dalby asked if the network could be incorporated into other USGS programs, such as the National Water-Quality Assessment (NAWQA).

Mr. Brooks replied that the Yellowstone NAWQA began in 1997. Currently, the Yellowstone NAWQA is in a reduced sampling phase. Originally, there was only one site on the Tongue River and that site is not being sampled now. It is doubtful that there is any funding in NAWQA to pick up the slack in the Tongue River Monitoring Network.

Ms. Bond clarified her earlier comment regarding EPA litigation and mediation of water-quality issues in the Tongue and Powder River Basins. In the context of the Yellowstone River Compact, she said that Montana's position is that the prior appropriation doctrine does protect water quality to the extent necessary to protect beneficial uses of water; therefore, water quality is a legitimate Compact issue. However, she recognized that Montana and Wyoming disagree on this issue, were currently involved in litigation and mediation of aspects of the water-quality issue elsewhere, and that there was little point in lengthy discussions of the Montana position before the Commission at that time.

Ms. Sexton asked if there is an opportunity for public comment during the Yellowstone River Compact Commission meetings. There is not a segment identified in the agenda for public comments.

Mr. Tyrrell replied that although there is not a section on the agenda for public comment, the public have been allowed to voice their opinion or make comments.

Mr. Horak replied that there is no formal place in the agenda. Comments typically are accepted and time is made for the comments in the meeting.

Mr. Horak asked for a date for the next Yellowstone River Compact Commission meeting. The Commissioners agreed to set aside December 5 and 6, 2007. The Yellowstone River Compact Technical Committee will meet on December 5 and the Yellowstone River Compact Commission will meet on December 6. The meeting place will be in Montana, probably Billings.

The meeting was adjourned by Mr. Horak.

Minutes of December 6, 2007

Members of the Yellowstone River Compact Commission convened the second of two meetings in 2007 on December 6 at 8:30 a.m. in Billings, Montana. In attendance were Mr. William Horak, U.S. Geological Survey (USGS), Chairman and Federal Representative; Ms. Mary Sexton, Director, Montana Department of Natural Resources and Conservation (DNRC) and Commissioner for Montana; and Mr. Patrick Tyrrell, Wyoming State Engineer and Commissioner for Wyoming. Also in attendance were Ms. Sue Lowry, Ms. Jodee Pring, Mr. Mike Whitaker, and Mr. Loren Smith, Wyoming State Engineer's Office; Mr. Peter Michael, Wyoming Attorney General's Office; Mr. Rich Moy, Mr. Chuck Dalby, Mr. Keith Kerbel, Ms. Jen Wilson, and Mr. Kevin Smith, DNRC; Ms. Sarah Bond, Montana Department of Justice; Mr. Art Compton, Montana Department of Environmental Quality (DEQ); Mr. Tim Felchle, Mr. Scott Guenthner, Mr. Patrick Erger, and Mr. Lenny Duberstein, Bureau of Reclamation; Mr. Mark Fix, Northern Plains Resource Council; Mr. Art Hayes, Jr., Tongue River Water Users Association; Mr. John Wheaton and Ms. Elizabeth Brinck, Montana Bureau of Mines and Geology (MBMG); and Mr. Kirk Miller, Ms. Melanie Clark, Mr. John Kilpatrick, and Mr. Wayne Berkas, USGS.

Mr. Horak called the meeting to order. He announced that he received a letter (Attachment A) from the Governor of Montana advising the Commission that Mary Sexton, Director of Montana Department of Natural Resources and Conservation, is the Commissioner for Montana. Mr. Tyrrell acknowledged that he also had received the letter.

Mr. Horak presented the agenda and asked for approval of the agenda. He reminded the Commissioners that only "mutually agreed" changes would be accepted at this time.

The agenda was adopted as presented.

Mr. Horak asked for approval of the April 25, 2007 minutes. Mr. Tyrrell made the motion to approve the minutes, and Ms. Sexton seconded the motion. The motion carried.

Mr. Berkas distributed a draft copy of the 2007 Yellowstone River Compact Commission Report (minus the April and December minutes). He asked the Commissioners to review the report and provide comments and corrections to him. He expressed his intention to add the approved December 2007 meeting minutes to the 2007 report and then ask the Commissioners to approve the report. Because of open meeting laws in Montana, the approval will take place via a conference call that is open to the public.

A discussion occurred regarding how to properly notify the public of all Yellowstone River Compact Commission meetings and conference calls. The Commissioners agreed that all meetings and conference calls would be announced on the Yellowstone River Compact Commission Web page and via e-mail distribution to those who usually attend the meetings.

Mr. Berkas presented budget information for the program of streamflow-data collection and preparation of the annual report. The program cost was $80,000 for Federal fiscal year 2007 and will be $84,000 for Federal fiscal year 2008. One-fourth of the cost is provided by the Wyoming State Engineer's Office, one-fourth by the DNRC, and one-half by the USGS through the Cooperative Water Program. Because Wyoming and Montana operate under a biennial budgetary cycle, the total cost for Federal fiscal year 2009 will be $89,000. At the April 25, 2007 meeting, Mr. Berkas discussed with the Commissioners that including fairly complete minutes from two meetings has increased the cost of producing the annual report. Because both States are under biennial budgetary cycles, the increased cost would not be assessed until Federal fiscal year 2010. Because there is a substantial increase in cost, Federal fiscal year 2010 would be a transition year and Federal fiscal year 2011 would impose the full cost. Those costs are $109,000 and $128,000, respectively. Mr. Berkas also stated that, providing Congress continues to fund the USGS Cooperative Water Program, the USGS Montana Water Science Center will provide 50 percent of the cost.

There was a discussion regarding which fiscal year's budget that the Commissioners would approve.

Mr. Horak read from "Rules and Regulations for Administration of the Yellowstone River Compact:"

Article IV. Budget

> A. At the annual meeting of each even-numbered year or prior thereto, the Commission shall adopt a budget for operation during the ensuing biennium beginning July first. Such budget shall set forth the total cost of construction, maintenance and operation of gaging stations, the cost of engineering and clerical aid, and other necessary expenses excepting the salaries and personal expenses of the Commissioners. On odd-numbered years revisions of the budget shall be considered.

Mr. Horak went on to say that his interpretation is the Commission is in the second year of an agreed upon 2-year budget. The Commissioners will agree and approve the budget for the next biennium (2009 and 2010) at the December 2008 meeting. Mr. Berkas has provided projected budgets for Federal fiscal years 2009 and 2010 at this time.

Mr. Tyrrell commented that the minutes for the April 25, 2007 meeting show a proposed 2009 cost of $88,200 and a proposed 2010 cost of $92,600. Now we are looking at $89,000 for 2009 and $109,000 for 2010, an increase of $16,400 in 2010.

Mr. Horak replied that the primary reason for the increase from that reported during the April meeting is the cost that the USGS Montana Water Science Center is incurring through the executive secretary, the role of Mr. Berkas,

for all services he provides, including Sotera Scoping (Gabrielle Patterson), and publication support. During the April meeting, there was discussion about the effort of all involved in producing the minutes and the annual report compared to the effort in the past. Now the effort is more substantial than for past reports. In April, Mr. Horak asked Mr. Berkas if he felt that funding was adequate for the executive secretarial support of the Commission. Mr. Berkas indicated that he needed to do an analysis to determine what the new procedures were costing.

Mr. Berkas added that after he did the analysis, he would ask for a cost increase at the December 2007 meeting for Federal fiscal year 2010. The Commissioners would be appraised of future costs beyond 2010.

Mr. Tyrrell noted that he had based his future budget planning on the April 2007 meeting, and he may be short money in 2009 and 2010.

Ms. Sexton asked Mr. Horak to clarify that the Commissioners do not approve the 2009-10 budget until the December 2008 meeting, and the 2007-08 has previously been approved.

Mr. Horak replied that she was correct.

Ms. Sexton asked if the 2009-10 costs were estimated.

Mr. Berkas replied that she was correct.

Mr. Horak noted that during the Yellowstone River Technical Committee meeting, held the previous day, Mr. Kilpatrick covered the budget status of the USGS Tongue and Powder River streamflow-gaging and water-quality monitoring program. He asked if anyone today had any questions regarding that topic.

Mr. Dalby asked if the Commission or the States could provide some support to increase funding in Federal fiscal year 2009.

Ms. Sexton replied that she is aware that the USGS needs $353,000 to bring the program back to a minimally funded level. She hoped that the DEQ could provide $25,000 toward this project, and she hoped that Wyoming Department of Environmental Quality could contribute $25,000. She said that the DNRC would work with congressional staffers to try to get congressional money directed to the monitoring program.

Mr. Tyrrell replied that the Wyoming State Engineer's Office also would work toward getting congressional money directed to the monitoring program. The Wyoming State Engineer's Office does not have money to contribute to the monitoring project, but they might be able to operate the Acme gage to help out the program. Mr. Tyrrell could not commit the Wyoming Department of Environmental Quality (WDEQ) to funding.

Mr. Horak asked, as a point of clarification, if the entire stream gaging for the project was funded except for Tongue River below Brandenberg Bridge and Goose Creek near Acme.

Mr. Kilpatrick replied that was correct.

Ms. Sexton asked who would be the USGS contact regarding funding updates and if funding became available.

Mr. Kilpatrick said he would be the appropriate contact.

Ms. Bond asked if all sites were funded for the full constituent load, specific conductance (EC), and sodium adsorption ratio (SAR).

Mr. Kilpatrick replied that currently two sites have no funding, no sites are funded for SAR, a few sites are funded for specific conductance, and there are different sampling frequencies and lists of constituents analyzed among the sites.

Ms. Sexton asked if some funds were found, how would the funds be distributed.

Mr. Kilpatrick replied that the USGS would work with the contributing agency to assure that the funding went to meet that agency's goals and needs.

Mr. Fix reminded the Commission that one site included in the program (Tongue River above T&Y Diversion, near Miles City) is funded by Fidelity Exploration and Production Company, as part of a settlement with Northern Plains Resource Council. The type of data and frequency of collection at that site will be reduced to match that at other sites in the program. Also, funding for that site will discontinue after 2009.

Mr. Berkas reported that streamflows during the 2007 water year were below normal at two sites, near normal (within 80 and 120 percent of average) at one site, and above normal at one site monitored by the Commission. Annual streamflow at Clarks Fork Yellowstone River at Edgar was 75 percent of average, and ranked seventh lowest of 69 years of record. The annual streamflow at Bighorn River near Bighorn (adjusted for the flow of the Little Bighorn River and change of contents in Bighorn Lake) was 60 percent of average and ranked seventh lowest of 41 years of record. The annual streamflow at Tongue River at Miles City was 125 percent of average and ranked 47th lowest of 64 years of record. The annual streamflow at Powder River near Locate was 86 percent of average and ranked 34th lowest of 69 years of record. Total adjusted streamflow of the four rivers in water year 2007 was 2,723,000 acre-ft, compared to 2,237,000 acre-ft in water year 2006 and 2,950,000 acre-ft in water year 2005.

Reservoir storage decreased in Boysen Reservoir, Bull Lake, and Buffalo Bill Reservoir, and increased in Anchor Reservoir, Pilot Butte Reservoir, Tongue River Reservoir, and Bighorn Lake. The contents and the amounts of decreases or increases are listed in the annual report. The total usable contents of these reservoirs at the end of water year 2007 was 1,808,000 acre-ft, compared to 1,689,100 acre-ft in water year 2006 and 2,149,000 acre-ft in water year 2005. Storage in other reservoirs in the four river basins at the end of water year 2007 was 229,600 acre-ft, an increase of 20,700 acre-ft from the end of water year 2006. The total usable contents of these other reservoirs are listed in the annual report. Despite the lower streamflow, however, Bighorn Lake increased its storage by 194,900 acre-ft.

Mr. Tyrrell said that he noticed that all but one reservoir reported in Table 10 of the annual report are in Wyoming. He asked, are there any other reservoirs in Montana?

Mr. Kerbel replied that there are no other reservoirs in Montana within the Tongue River Basin. Within the Clarks Fork of the Yellowstone River Basin, there is Cooney Reservoir that holds about 28,000 acre-ft and Glacier Reservoir that holds about 4,300 acre-ft.

Mr. Tyrrell requested that all reservoirs (public and private), within the Yellowstone River Compact boundary, greater than 90 acre-ft be included in the 2008 annual report.

Mr. Kerbel reported that the Yellowstone River Technical Committee met yesterday and he would provide a summary of what transpired during the meeting. The minutes from that meeting are posted on the Yellowstone River Compact Commission Web page at *http://yrcc.usgs.gov/*. Those minutes are appended to these minutes.

Mr. Kerbel reported that Mr. Barry Lawrence from the Wyoming Water Development Commission gave a presentation on Wyoming's weather modification program. Also, during the technical meeting, Ms. Melanie Clark, USGS, Wyoming Water Science Center, presented a report she authored regarding water-quality trends in the Tongue and Powder Rivers from 2001 through 2005, and Ms. Sally Springer from the National Weather Service talked about new Web pages that could be beneficial to water managers and scientists.

Mr. Kerbel reported that the committee discussed the Yellowstone River Compact Commission Web page administered by the U.S. Geological Survey. Due to realignment within the USGS, it is uncertain who will be the webmaster for the Commission's Web page. Archiving of past documents on the Web page was discussed. The cost of scanning and serving the documents may be $20,000 to $30,000.

Mr. Kerbel reported that the Committee discussed indicator gages in the headwaters of the river basins. The indicator gages would be existing gages with historical records that could be used to determine how the current year compared to past years.

Mr. Kerbel reported that Mr. John Kilpatrick, USGS, presented information on the Tongue River surface water-quality monitoring network, primarily funded through a Congressional earmark. The earmark was discontinued in Federal fiscal year 2008 and much of the program is not funded. Approximately $350,000 of additional money is needed to fund the network at 2007 levels.

Mr. Kerbel reported that timely rain storms and flows in the Powder River in Montana were reasonable during water year 2007, but there were still water users who came up short in July and August when flows in the river decreased. Flows in the Tongue River were much better due to timely storms and a full reservoir (Tongue River Reservoir). The Bighorn River Basin had a below normal snowpack and no big rain storms. Bighorn Lake filled, but flows out of the dam remained low. The Bureau of Reclamation spring releases were 1,500 ft^3/s and rainbow trout spawning took a hit due to the lack of water in the side channels. The Bureau bumped up releases this fall to about 1,750 ft^3/s from Yellowtail Dam for the brown trout spawning. Mr. Kerbel's opinion was these low flows will also impact brown trout spawning.

Mr. Whitaker reported that flows in the Powder and Tongue River in Wyoming were good this year. Structural problems occurred at Lake DeSmet and water was released from that lake for most of the summer. Lake DeSmet will not be storing water this winter until repairs are completed. The Wyoming State Engineer's Office requested a SNOTEL site be installed in the Cross Creek area of the Little Goose Creek drainage, at about 9,000 ft. elevation. Unfortunately, a fire took out the SNOTEL equipment at Bone Springs, Wyoming.

Mr. Loren Smith reported that the Bighorn River system in Wyoming had a bad year. The worst was in the Greybull valley. Shell Creek flowed fairly well. Fourteen systems in the Bighorn River Basin were regulated this year, and regulation went back to 1889 appropriation dates in the Lander area.

Ms. Bond asked Mr. Tyrrell to summarize the Coal-Bed Natural-Gas Taskforce discussion he gave during the technical committee meeting.

Mr. Tyrrell replied that there is legislation related to coal-bed natural-gas extraction in Wyoming working through the Wyoming State Legislature. One bill deals with express authority for watershed permitting for WPDS permits (Wyoming's version of NPDS). Another bill deals with stream-channel conveyance and capacity. This bill would make it unlawful to supplement flows to exceed the natural capacity of the channel. Mr. Tyrrell also mentioned that his office has become concerned that in areas CBM wells are producing much water but little or no gas. Current statutes allow the SEO to add conditions to ground-water permits that would base the future efficacy of those permits on the production of gas. There will be a show-cause requirement if gas is being produced, the permit will remain in force.

Mr. Dalby recalled that in the past he thought the Wyoming State Engineer's Office provided average annual discharge of coal-bed methane water and flux of coal-bed methane water through reservoirs. He asked if those discharges were estimated based on typical rates of CBM well discharge or reflected actual measured values for each well.

Mr. Tyrrell replied that the Wyoming State Engineer's Office did not determine those numbers. Numbers that he has seen regarding water produced from coal-bed methane producing wells have come from WDEQ because each producer has a reporting requirement with that agency. Also, the Wyoming Oil and Gas Conservation Commission posts conditions and permits of gas-producing wells on their Web page. The Wyoming State Engineer's Office periodically will make estimates of throughput, but it is not done annually.

Mr. Dalby asked if anyone has determined how much evaporation has occurred in the permitted ponds.

Mr. Tyrrell replied that the Wyoming State Engineer's Office is discovering that many newly permitted reservoirs previously were existing unpermitted stock ponds, and land owners are now getting those reservoirs permitted. Certainly, there is more exposed water surface where evaporation is taking place, but it is unknown as to what water is derived from coal-bed methane production (ground water) as opposed to surface-water runoff.

Ms. Bond asked Mr. Tyrrell if the show-cause requirement regarding producing water when not producing gas were based on new reports.

Mr. Tyrrell replied that the Wyoming Geological Survey did some investigations and had produced a report on water and gas production in the basin. Mr. Tyrrell also said that the coal-bed natural gas permits are to be reviewed after 5 years, and the Wyoming State Engineer's Office is reviewing many of the permits now and looking at the water and gas production characteristics of the wells.

Mr. Horak asked Mr. Kerbel and Ms. Lowry to send him the minutes from the Yellowstone River Technical Committee meeting and the MS PowerPoint presentations so he could get them posted on the Yellowstone River Compact Commission Web page.

Mr. Horak asked the Commissioners if they had any questions or comments regarding the weather modification presentation at the Yellowstone River Technical Committee meeting.

Ms. Sexton asked that the Commission continue to receive updates.

Mr. Tyrrell replied that at a minimum, the Wyoming State Engineer's office could provide progress reports at future meetings.

Mr. Horak asked the Commissioners if they had any questions or comments regarding coal-bed methane development discussions during the Yellowstone River Technical Committee meeting.

Ms. Sexton replied that at the next meeting, she might be able to get someone to talk about Sage Grouse litigation. Having the Sage Grouse listed as an endangered species might effect coal-bed methane development in Montana and Wyoming.

Mr. Horak asked Ms. Sexton if she could update the Commission on water-rights adjudication in Montana.

Ms. Sexton replied that the summary report for the upper Tongue River (42B) will go to the Water Court in late December. The summary report for the lower Tongue River below Hanging Woman Creek (42C) will be sent soon. Thus far, 22,000 claims have been examined statewide, exceeding the benchmark of 19,000 claims to be examined by 2008. There are still about 36,000 claims to be examined.

The funding for the adjudication process is no longer by fee, rather it is funded by the Montana Legislature for over $20 million, with the money in escrow to fund future years.

There is some concern about whether the Montana Water Court can keep up with their processing of all the summary reports. Once there is a summary report and a preliminary decree, the process to final decree depends on the speed with which the Water Court can look at the objections and complete the process. The process is slowed if there are a lot of objections and issues. The Water Court is scheduled to complete the process within 5 years of completing the claims examination.

Mr. Tyrrell asked if the summary reports (42B and 42C) are available to the public.

Ms. Sexton replied that all the summaries are on DNRC Web page.

Mr. Horak welcomed Mr. John Wheaton, Senior Hydrologist with the MBMG. Mr. Wheaton gave an update on the Drilling/Monitoring Program in the coal aquifers. The following is a summary of the presentation, questions, and answers:

There has been a decrease in the number of permits for new coal-bed methane wells, and part of the reason is that the industry is moving toward wells that access multiple coal seams. This way, fewer wells are needed.

This year, the amount of water produced from coal-bed methane activities in Wyoming was a little over 50,000 gal/min, or a little over 100 ft^3/s. In Montana the amount of water produced from coal-bed methane activities was between 2,500 and 3,000 gal/min, or between 6 and 7 ft^3/s.

The MBMG investigated retention ponds, and in the case of unlined ponds, they documented that about one-half of the water in the pond infiltrates through the pond before the pond floor becomes sealed. The other one-half is lost to evaporation. Obviously, in lined ponds, all the water is lost to evaporation.

The MBMG (David Lopez) recently completed a map of sandstone formations that may have potential for receiving reinjected coal-bed methane produced water. Some companies are injecting produced water back into coal seams. This new thought on water management would be to move the water from coal seams to sandstones of the same formation.

The ground-water monitoring program continues to show about 100 feet of drawdown along the State line. Some recovery is occurring near the western edge of the basin as coal-bed methane production ends in that area; in some locations, the recovery is near the recharge rate. When wells near the center of the basin are turned off, the recovery is not as rapid, and that is what was expected.

The MBMG is working with the Wyoming Geological Survey to produce joint annual hydrology reports.

Mr. Moy asked Mr. Wheaton to describe the surface-ground water relation in the Powder River structural basin.

Mr. Wheaton replied that all of the coal units are above the Lebo Shale, the confining unit in the basin. Thus, all of the coal units are discharging to surface-water drainages between the State line and the Yellowstone River.

Mr. Dalby asked Mr. Wheaton if there have been any studies to determine if the ground-water drawdown was decreasing the amount of streamflow.

Mr. Wheaton replied that the only place where he could say with confidence that there is depression in the ground water table that intersects the surface water is under Tongue River Reservoir. In this case, the Canyon and Dietz coals are within the alluvium of the river, and a couple of gal/min are moving into those units from the reservoir.

Mr. Horak asked if there was an update of the Montana/Crow Compact.

Ms. Bond replied that there is ongoing discussion between Montana, the Crow Tribe, and the Federal government. The Compact was approved in a special session of the Montana Legislature. There still are some issues to be resolved between the Federal government and the Crow Tribe. When all issues are resolved, the Compact will move forward to Federal legislation.

Ms. Sexton stated that a representative from the Reserved Water Rights Compact Commission will be asked to make a presentation at the next Commission meeting to update the progress on the Montana/Crow Compact.

Mr. Horak asked the Bureau of Reclamation to update the Commission on Bighorn Lake water-supply issues.

Mr. Felchle replied that this year the inflow to Bighorn Lake was about 1,360,000 acre-ft, the fifth lowest of record. Through the year, the lake got to within 2 feet of being full. Due to low inflows into the lake, outflows from Yellowtail Dam were maintained between 1,500 and 1,750 ft^3/s during the spring and summer. Now, based on lake elevations, discharge from the dam will be maintained at about 1,900 ft^3/s through the winter.

All of the water this year was used for power generation, but that amount was 40 percent of average.

The dam released 1,170,000 acre-ft during the year, and 80,000 acre-ft went to the Crow Indian Irrigation Project, about 73 percent of their long-term average.

The Commissioners agreed to have the next Yellowstone River Compact Commission meeting in Cody, Wyoming, on April 17, 2008 (Thursday), with the Yellowstone River Technical Committee meeting on April 16, 2008.

Mr. Horak adjourned the meeting.

Patrick T. Tyrrell

Commissioner for Wyoming

Mary Sexton

Commissioner for Montana

William F. Horak, Jr.

Chairman and Federal Representative

Appended Minutes, Technical Committee–April 24, 2007

Yellowstone River Compact Commission, Technical Committee Discussions, Sheridan County Courthouse, 2nd Floor, Sheridan, Wyo.

1. Introductions

Keith Kerbel called the meeting to order at 2:15 p.m. Introductions were made and a signup sheet was sent around. No additions were made to the agenda.

2. Hydrological information from various sources:

Natural Resources Conservation Service

Roy Kaiser presented a *PowerPoint* summarizing the snow accumulations in the basin. Roy pointed out that the large snow accumulations that were received from the end of March storm, particularly in the Tongue River drainage, certainly helped the outlook, but all four of the major Yellowstone tributary basins remain below average.

Lee Hackleman also presented a *PowerPoint* focusing upon the upper drainages of the Wind, Bighorn and Shoshone River basins in Wyoming.

U.S. Geological Survey

Wayne Berkas provided a handout of information on Montana key gages with bar graphs of the period of record and flows for this water year so far.

National Weather Service

Sally Springer presented a *PowerPoint* of the precipitation received thus far in the water year. The longer term forecast is for normal temperatures and slightly lower precipitation.

3. Forecasts and runoff estimates

Roy handed out a summary of the forecasts based on April 1 conditions (*PowerPoint*). Lee stated that the April 15 adjustments will be just slightly increased from the April 1 estimates. Current estimates show the Powder River at 63 percent of average, the Tongue at 100 percent and the Bighorn drainage at 60 percent.

4. Reservoir operations and storage information

Bighorn Reservoir operations and long term management discussions

Lenny Duberstein, Bureau of Reclamation's Montana Area Office, presented a review of the work done thus far by the Long Range Operations Group (*PowerPoint*). The group first met in March 2007 in Powell, Wyoming, and next on April 12 at Fort Smith, Montana. A problem statement and Charter is being developed and the group plans to meet about every 6 weeks to discuss what operational changes might be considered to accommodate more

of the users of the reservoir and its water supply. Lenny also described the MOU between Reclamation and the National Park Service regarding their cooperative efforts at the National Recreation Area surrounding the reservoir. More information on the group can be found at *http://www.usbr.gov/gp/mtao/yellowtail/bighorn_longterm.cfm*.

John Lawson, Reclamation's Area Manager in Mills, Wyoming, then presented information on the operations of Boysen and Buffalo Bill Reservoirs in Wyoming (*PowerPoint*). John reported that, currently, inflows to Buffalo Bill are estimated at 66 percent and Boysen at 54 percent of average. John described the reality of the one-fill rule in Wyoming and its impact on reservoir management. Reclamation works closely with the Wyoming Game and Fish in determining winter releases, but that John cannot impact his contractual obligations to space holders when determining releases for winter instream flows or for spring flushing flows. John described that Buffalo Bill Dam was raised in 1981 and the enlargement was done in partnership with the State of Wyoming Water-Development Commission.

Lake DeSmet—Bruce Yates

A joint powers board is responsible for the management of Lake DeSmet since it was acquired from Texaco a few years ago. A Level II study was funded by the Wyoming Water-Development Commission to review the firm annual yield from DeSmet and begin to outline possible future uses from the lake. A subdivision has been platted for the west side of the lake, which could have management ramifications for the JPB. Bruce's PowerPoint can be found at *Lake_DeSmet.ppt*.

5. Wyoming State Climatologist—Steve Gray

Steve described that drought conditions for Wyoming improved after the late March snowstorm, but drought conditions as shown in the Drought Monitor are still "moderate." The April to June period in 2006 was extremely dry in Wyoming's basins of the Yellowstone drainage. The March 28-29 storm made a difference for the Tongue River, but not the Wind/Bighorn Rivers. The long-term precipitation deficits of this drought are impacting soil moisture and other factors included in the SWSI for this year. The 60-day outlook from mid April to July shows some improvement. Steve's PowerPoint can be found at *Gray.ppt*.

6. Request from Commission to identify "indicator" gages in each basin

Myron Brooks provided a handout that had been developed by Kirk Miller from the USGS Wyoming Water Science Center showing potential long-term, real-time gages that could be candidates for the Technical Committee's consideration. The Committee agreed that we did not have sufficient guidance from the full Commission as to our charge and what the uses of the gages might be. We will request further discussion from the Commissioners tomorrow.

7. Coal-bed natural-gas discussion

Montana Bureau of Mines and Geology information

John Wheaton, MBMG, described the monitoring network that Montana has in place along the State line with Wyoming. Some of these wells have been in place since the 1970s and were originally installed to track water

impacts from the area coal mines. John's main areas of emphasis have been in the Prairie Dog, Hanging Woman and Powder River drainages. His PowerPoint can be found at *Wheaton.ppt*.

In the interest of time, the following agenda items (7ii, 7iii, 7iv, 8 and 9) that were slated for Technical Committee discussion were delayed and discussed during the full Commission meeting on the following day.

i. Development numbers since last Commission meeting
ii. Platte River pipeline study
iii. Wyoming EQC activities

8. Tongue River USGS monitoring network funding

9. Commission minutes discussion

10. Report of meeting highlights and recommendations to Commission meeting, April 25, 2007

Highlights to be brought before the full Commission:

- Current conditions and streamflow forecast estimates
- Indicator gage work completed by Kirk Miller
- Short re-cap of presentations made by:
  - Lenny Duberstein
  - John Lawson
  - Bruce Yates
  - Steve Gray
  - John Wheaton

(John Wheaton will be asked to provide a brief summary to the full Commission.)

11. Set next meeting

The Technical Committee will likely meet the day prior to the next full Commission meeting which will be determined tomorrow.

The meeting adjourned at 6:10 p.m.

List of attendees:

NAME	REPRESENTING	E-MAIL
Mr. Loren Smith	Wyoming State Engineer's Office	*lsmith@seo.wyo.gov*
Mr. Peter Michael	State of Wyoming, Attorney General's Office	*pmiche@state.wy.us*
Ms. Sue Lowry	Wyoming State Engineer's Office	*slowry@seo.wyo.gov*
Ms. Sally Springer	National Weather Service – Billings	*Sally.Springer@NOAA.gov*
Mr. Lee Hackleman	Wyoming NRCS	*lee.hackleman@wy.usda.gov*
Mr. Mark Opitz	Wyoming NRCS	*mark.opitz@wy.usda.gov*
Mr. Christian Levine	Montana DEQ	*clevine@mt.gov*
Ms. Sarah Bond	State of Montana, Attorney General's Office	*sbond@mt.gov*
Mr. Chuck Dalby	Montana DNRC	*cdalby@mt.gov*
Mr. Wayne Berkas	USGS Montana Water Science Center	*wrberkas@usgs.gov*
Mr. Bill Horak	USGS, Chairman and Federal Representative	*wfhorak@usgs.gov*
Ms. Carmine LoGuidice	Wyoming State Engineer's Office	*clogui@seo.wyo.gov*
Mr. Bill Knapp	Wyoming State Engineer's Office	*bknapp@seo.wyo.gov*
Mr. Kevin Smith	Montana DNRC-SWP	*ksmith@mt.gov*
Mr. Art Hayes Jr.	Tongue River Water Users	*browncattle@rangeweb.net*
Ms. Evelyn Roundstone	Northern Cheyenne Tribe	*e_reoundstone@yahoo.com*
Mr. Mike Whitaker	Wyoming State Engineer's Office	*mwhita@seo.wyo.gov*
Mr. Patrick Erger	Bureau of Reclamation	*perger@gp.usbr.gov*
Mr. Bruce Yates	Sheridan County – Lake DeSmet	*byates@sheridancounty.com*
Mr. John Wheaton	Montana Bureau of Mines and Geology	*jwheaton@mtech.edu*
Mr. Doyl Fritz	WWC Engineering	*dfritz@wwcengineering.co*
Mr. Steve Gray	University of Wyoming – WRDS	*sgray8@uwyo.edu*
Mr. Myron Brooks	USGS Wyoming Water Science Center	*mhbrooks@usgs.gov*

Appended Minutes, Technical Committee–December 6, 2007

Yellowstone River Compact Commission, Technical Committee Discussions, Sheridan County Courthouse, 2nd Floor, Sheridan, Wyo.

1. Introductions

Keith Kerbel called the meeting to order at 1:30 p.m. Introductions were made and a signup sheet was passed around. The agenda was then modified, moving all the presentations to the top and adding Sally Springer, National Weather Service, to the agenda and removing the water-supply outlook topic.

2. Invited presentations

Wyoming Water Development Commission

Barry Lawrence and Roelof Bruinljes of Wyoming's Water Development Commission had a powerpoint presentation on their Weather Modification Program. Roelof explained about a 5-year randomized cloud-seeding experiment that will be conducted over the Medicine Bow/Sierra Madre and Wind River Ranges and will measure its effects.

USGS Wyoming Water Science Center

Melanie Clark, USGS, Wyoming Water Science Center, had a powerpoint presentation on a water-quality report for sites along the Tongue, Powder, Cheyenne, and Belle Fourche Rivers from 2001-2005. She reported that coalbed methane has had some effect on trends. Though there was no single cause of effects, the Powder River Basin was more variable, having higher levels of SAR and specific conductance, than Tongue River and Clear Creek, which had lower and similar values. Melanie described that after adjustments are made for flow, no significant trend was found for specific conductance. For SAR, there were not sufficient data on the mainstem Tongue, but an upward trend was found on Salt Creek, Powder River at Sussex and Powder at Arvada. The Little Powder showed a downward trend after adjusting for flow. In the following discussion, Chuck Dalby pointed out a recent article (Wang and others, December 2007, Journal of the American Water Resources Association) that examined water-quality trends in the Powder River and attributed indicated increasing values of SAR to CBM development in Wyoming.

3. Water Management Activities 2007–Irrigation Season

Tongue River

Wyoming–Mike Whitaker reported on the water supply on Big Goose and Little Goose Creeks. Big Goose discharge is at 61,890 acre-ft and Little Goose is at 49,273 acre-ft, which are above normal on a 21-year average. Mike has ordered in measuring devices on the mainstem Tongue River.

Montana–Keith Kerbel and Kevin Smith reported that the Tongue is doing better than last year. The dam filled early this year on May 13, and had started to spill. Presently it is 65 percent full.

Powder River

Wyoming–Carmine LoGuidice reported that Lake DeSmet has plenty of water and there should have good carry over for next year.

Montana–Keith's report was based on discussions with local irrigators on the source. Irrigators nearer Broadus reported timely spring rains in this area reduced the need for irrigation in the spring of 2007. River flows were adequate for the first and second cuttings of hay nearer the State line. Deteriorating water quality in the Powder around the middle of July prevented any further water use. The Powderville area, located north of Broadus, had a different picture. They were short of irrigation water for their second cutting of hay. Generally, most irrigators in this area got about 60 percent of their hay ground irrigated a second time. Since about the first of October (2006), there have been good flows in the Powder, with low SARs and ECs, and the irrigators assumed Lake DeSmet was releasing water this past fall.

Bighorn River

Wyoming–Loren Smith reported that Wyoming's winter snowpack was down around 60 percent of normal at the beginning of the irrigation season, but the area received some rain showers in late July. The west flank of the basin faired better. Boysen Reservoir is at 65 percent capacity and Buffalo Bill Reservoir is at 75 percent and with winter releases below Boysen Reservoir being below what is desired by the Wyoming Game and Fish.

Montana–Keith's report was based on information from Fish, Wildlife and Parks, Bureau of Reclamation, and personal observations that spring releases from Bighorn Lake were low at 1,500 ft^3/s. The rainbow trout population took a big hit because there was little or no water in the side channels of the river below the dam which reduces spawning and food production. The summer and fall flows were below 2,000 ft^3/s, which had the same net effect on the brown trout population.

4. Update of CBM Activities

Wyoming–Pat Tyrrell, Wyoming State Engineer, discussed the CBM task force on coal-bed methane and natural gas. Pat touched on three topics:

1. DEQ is going forward with issuing a general watershed permit for CBM discharges.
2. The Wyoming Legislature's Minerals Committee will sponsor a bill in the 2008 session to give the authority to the State Engineer's Office to measure the natural capacity of a stream channel and then order the construction of ditches or limit the introduction of discharge water from CBM wells in a channel if its capacity is exceeded.
3. SEO is meeting with producers concerning new requirements for the producer to show cause why a CBM well should continue producing water when there is no gas being produced.

Filings for CBM impoundments are down in the Tongue and Little Powder River basins, but the number of facilities increased by about a 100 in the Powder River Basin area. Storage capacity in this basin increased from 31,500 acre-ft to 34,300 acre-ft.

Montana–Art Compton reported that there are 960 wells mainly in the CX, three discharge permits were issued and two are pending with treatment facilities using the Higgins Loop technology. A water-quality lawsuit brought by several oil companies challenging the Montana water-quality regulations in Montana State district court was heard on July 2, 2007. Judge Jones upheld the regulations on all counts on cross motions for summary judgment action (the matter is currently on appeal at the Montana Supreme Court.)

5. YRCC Web site and postings

Sue Lowry and Bill Horak informed the committee that the USGS Webmaster is no longer assigned to Bill's department within the USGS and much discussion resulted from this news. It was discussed that maybe each of the states take turns with operating the Web site or doing a joint venture. It was finally decided with persuasion from the Commissioners of each state that Bill should first try and resolve this internally within the USGS and report back at the spring meeting. Another discussion followed regarding the cost of archiving past Compact reports and is mainly the cost of labor. An estimate by Bill was around $25,000 to $30,000.

6. Status of a small group reviewing indicator gages

Kirk Miller from the USGS made a presentation regarding indicator gages and passed out handouts. Sue Lowry briefed the group on natural-flow gages and a discussion by all followed. It was decided to select the existing State line gages and an existing gage above most water development on each source. Specific existing gage records and methods of graphically presenting information were presented on the handouts provided by Kirk. The Commissioners expressed their support for the work done thus far, but felt some additional work could be done on how the period of record and scales are shown on the box diagrams.

7. Update on the funding for the Tongue River streamflow-gaging network

John Kilpatrick of the USGS passed out handouts showing the funding levels for each gage site and type of sample taken at each site with a total cost of $711,300. There is presently a shortfall of $353,530 for the current sampling project to continue. Currently, there is only $357,770 available, which will require a reduction of the monitoring effort outlined in John's handout. Each state will contact their local congressional delegation for continued support of this project. Each Commissioner expressed support for this project, but recognized the pressure that is on all gaging program budgets.

Meeting was adjourned at 5:25 p.m.

Attachment A—Letter from Governor of Montana Appointing Mary Sexton as the Commissioner for Montana

OFFICE OF THE GOVERNOR
STATE OF MONTANA

BRIAN SCHWEITZER
GOVERNOR

JOHN BOHLINGER
LT. GOVERNOR

November 19, 2007

Mr. William Horak, U.S. Geological Survey,
Chairman and Federal Representative
Yellowstone Compact Commission

Honorable David Freudenthal
Governor of the State of Wyoming
Cheyenne, Wyoming 82002

Honorable John Hoeven
Governor of the State of North Dakota
Bismarck, North Dakota 58501

Mr. Patrick Tyrrell,
Wyoming State Engineer,
Commissioner for Wyoming

Dear Sirs:

Please be advised that pursuant to Article III of the Yellowstone River Compact, I have appointed Mary Sexton, Director of the Montana Department of Natural Resources and Conservation to be Commissioner for the State of Montana. Ms. Sexton was appointed acting commissioner in 2006. With this letter, I appoint Mary Sexton as the Commissioner for the State of Montana effective as of November 16, 2007.

Thank you in advance for your attention to this matter. The Commissioner may be reached at:

Mary Sexton, Director
Department of Natural Resources and Conservation
1625 11th Avenue
Helena, MT 59620-1601
(406) 444- 2074

Sincerely,

BRIAN SCHWEITZER
Governor

STATE CAPITOL • P.O. BOX 200801 • HELENA, MONTANA 59620-0801
TELEPHONE: 406-444-3111 • FAX: 406-444-5529 • WEBSITE: WWW.MT.GOV

General Report

Cost of operation and budget

Work funded by the Yellowstone River Compact Commission, which to date has been primarily concerned with the collection of required hydrologic data, has been financed through cooperative arrangements whereby Montana and Wyoming each bear one-fourth of the cost, and the remaining one-half is borne by the United States. Salaries and necessary expenses of the State and U.S. Geological Survey representatives to the Commission and the cost to other agencies of collecting hydrologic data are not considered as expenses of the Commission.

The expenses of the Commission during fiscal year 2007 were $80,000, in accordance with the budget adopted for the year.

Estimated budgets for Federal fiscal years 2008, 2009, 2010, and 2011 were tentatively adopted subject to the availability of appropriations. The increases from 2008 through 2009 were based on an approximate 5-percent increase per year. The increase from 2009–10 is based on meetings and an increase in publication costs for the annual report. The budgets for the four fiscal years are summarized as follows:

October 1, 2007, to September 30, 2008 (fiscal year 2008):
Estimate for continuation of existing streamflow-gaging programs $84,000

October 1, 2008, to September 30, 2009 (fiscal year 2009):
Estimate for continuation of existing streamflow-gaging programs $89,000

October 1, 2009, to September 30, 2010 (fiscal year 2010):
Estimate for continuation of existing streamflow-gaging programs $109,000

October 1, 2010, to September 30, 2011 (fiscal year 2011):
Estimate for continuation of existing streamflow-gaging programs $128,000

Streamflow-gaging station operation

Operation of streamflow-gaging stations at the measuring sites specified in the Yellowstone River Compact continued in water year 2007 and satisfactory records were collected at each station. Locations of streamflow-gaging stations, along with reservoir-content stations, are shown on a map of the Yellowstone River Basin at the end of this report.

For measurement sites, horizontal coordinate information (latitude and longitude) is referenced to the North American Datum of 1927 (NAD 27). The gage datums and elevations listed in this report are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

During water year 2007, annual streamflow was below normal[2] at two streamflow-gaging stations. Streamflow at Tongue River at Miles City was above normal and Powder River at Locate was normal. The rank of the annual streamflow, with the lowest annual streamflow having a rank of 1, is displayed in the following table:

Station number	Streamflow-gaging station	Percent of average streamflow for water year 2007[1]	Rank of annual streamflow		Year of lowest annual streamflow (rank equals 1)	Number of years of annual record
			2007 water year	2006 water year		
06208500	Clarks Fork Yellowstone River at Edgar, Mont., minus diversions to White Horse Canal	75	7	12	2001	69
06294500	Bighorn River above Tullock Creek, near Bighorn, Mont., minus Little Bighorn River near Hardin, Mont., adjusted for change in contents in Bighorn Lake	60	7	5	2002	41
06308500	Tongue River at Miles City, Mont.	125	47	5	1961	64
06326500	Powder River near Locate, Mont.	86	34	9	2004	69

[1]Average is based on period of record at station.

[2]The "normal" range defined in this report is 80 to 120 percent of average.

Tabulation of streamflow records for water year 2007 and graphical comparisons of statistical distribution of monthly and annual streamflow, and annual departures from mean annual streamflow are provided in the section "Summary of discharge for Yellowstone River Compact streamflow-gaging stations." The tabulated streamflow records do not account for depletions for irrigation and other uses unless otherwise noted.

Diversions

No diversions were regulated by the Commission during water year 2007.

Reservoir Contents

Reservoirs Completed after January 1, 1950

Month-end and year-end usable contents and a description of these reservoirs are given in the section "Month-end contents for Yellowstone River Compact reservoirs completed after January 1, 1950." Boysen Reservoir, located on the Wind River and operated by the Bureau of Reclamation, began the water year with 407,700 acre-ft in usable contents and ended the water year with 349,600 acre-ft. Anchor Reservoir began the water year with 233 acre-ft in usable contents and ended the water year with 254 acre-ft. Bighorn Lake, a Bureau of Reclamation storage project on the Bighorn River that is the largest in the Yellowstone River Basin, contained 745,800 acre-ft of usable contents at the beginning of the water year and 940,700 acre-ft at the end of the water year. Daily usable contents of Bighorn Lake ranged from 746,500 acre-ft on October 1, 2006, to 1,032,000 acre-ft on June 25 and 26, 2007.

Reservoirs Existing on January 1, 1950

As a matter of record and general information, month-end usable contents data are given in table 9 of the report for four reservoirs in existence on January 1, 1950, upstream from the points of measurement. The reservoirs are Bull Lake, Pilot Butte Reservoir, Buffalo Bill Reservoir, and Tongue River Reservoir. These data are pertinent to allocation under Article V, Section C, Item 3 of the Compact. Month-end and year-end usable contents of these reservoirs are given in the section "Month-end contents for Yellowstone River Compact reservoirs existing on January 1, 1950."

The storage capacity of Buffalo Bill Reservoir was increased in 1992 from 456,600 acre-ft to 644,540 acre-ft (listed as 646,565 acre-ft by Bureau of Reclamation). The usable contents of Tongue River Reservoir was increased in 1999 from 68,000 acre-ft to 79,070 acre-ft.

Annual Contents of Reservoirs

Information on reservoir contents at the end of the current (2007) and previous water years for the 7 reservoirs listed above plus 23 additional reservoirs was compiled at the request of the Commission. The information is provided in table 10 in the section "Water-year-end contents for Yellowstone River Compact reservoirs or lakes."

Summary of Discharge for Yellowstone River Compact Streamflow-Gaging Stations

06208500 Clarks Fork Yellowstone River at Edgar, Mont.

LOCATION.--Lat 45°27′58″, long 108°50′35″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ sec.23, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at river mile 22.1.

DRAINAGE AREA.--2,022 mi².

PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to September 2007.

REVISED RECORDS.-- Water Supply Paper (WSP) 1509: 1924; 1932, maximum discharge. WSP 1729: Drainage area. Water Data Report MT-04-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft, referenced to the National Geodetic Vertical Datum of 1929. Prior to Aug. 31, 1953, nonrecording gage located at same site and elevation.

REMARKS.--Records are good except those for the estimated daily discharges, which are poor. Diversions for irrigation include about 41,500 acres, of which about 840 acres lie downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek Basin. U.S. Geological Survey satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year. Discharge values and summary statistics given herein have the diversions to White Horse Canal subtracted.

Table 1. Daily mean discharge for the Clarks Fork Yellowstone River at Edgar, Mont. (06208500), minus diversions to White Horse Canal, October 2006 through September 2007.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	460	513	e300	e280	e270	331	458	2,460	1,890	1,030	347	99
2	449	458	e330	e300	e280	329	520	2,830	1,800	977	300	96
3	481	481	e330	e320	e290	327	502	3,100	1,990	915	315	104
4	474	531	e350	e310	e310	309	462	2,790	2,530	848	306	110
5	518	538	e340	e300	e320	326	447	2,270	2,960	767	282	106
6	502	517	e350	e280	e320	351	439	1,890	3,620	726	261	105
7	522	493	e350	e250	e310	349	434	1,590	6,780	690	242	123
8	545	497	e350	e270	e300	381	430	1,620	4,480	716	220	174
9	822	778	e350	e280	e280	386	445	2,000	3,110	643	181	179
10	880	868	e350	e280	e290	377	527	2,560	2,730	531	146	212
11	864	718	e340	e230	e300	359	543	3,070	2,660	477	138	241
12	875	661	e330	e150	e280	348	477	3,540	2,840	423	136	241
13	799	649	e330	e200	e270	351	458	3,990	2,820	382	137	211
14	745	592	e330	e250	e270	376	439	4,310	2,810	344	127	210
15	703	628	e320	e280	e280	448	439	4,060	2,820	349	118	223
16	695	561	e310	e300	e300	429	500	3,510	2,920	264	113	214
17	715	564	e250	e280	e320	376	528	3,390	3,010	236	121	207
18	724	604	e260	e300	e330	368	574	3,380	2,960	224	123	217
19	669	565	e260	e300	e340	384	727	3,360	2,470	182	125	231
20	670	529	e280	e300	e330	449	771	3,420	1,980	166	139	248
21	711	533	e300	e300	e320	474	638	3,490	1,840	194	124	245
22	668	542	e320	e300	e320	484	624	3,270	1,870	250	112	246
23	625	530	e330	e310	e320	437	598	2,750	1,970	219	107	262
24	599	509	e340	e320	e320	409	628	2,190	1,980	156	107	305
25	596	487	e350	e320	e320	386	676	1,770	1,900	136	114	293
26	592	480	e350	e310	347	391	780	1,520	1,720	168	124	338
27	581	e450	e350	e300	356	460	869	1,300	1,530	367	111	327
28	542	e300	e330	e290	337	533	837	1,370	1,340	536	106	318
29	547	e250	e300	e280	--	533	1,220	1,960	1,170	577	102	324
30	541	e280	e280	e280	--	492	1,950	2,180	1,080	489	98	337
31	539	--	e250	e280	--	471	--	1,930	--	409	101	--
Total	19,653	16,106	9,910	8,750	8,630	12,424	18,940	82,870	75,580	14,391	5,083	6,546
Mean	634	537	320	282	308	401	631	2,673	2,519	464	164	218
Max	880	868	350	320	356	533	1,950	4,310	6,780	1,030	347	338
Min	449	250	250	150	270	309	430	1,300	1,080	136	98	96
Ac-ft	38,980	31,950	19,660	17,360	17,120	24,640	37,570	164,400	149,900	28,540	10,080	12,980

Table 1. Daily mean discharge for the Clarks Fork Yellowstone River at Edgar, Mont. (06208500), minus diversions to White Horse Canal, October 2006 through September 2007.—Continued

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921–2007, BY WATER YEAR (WY) *												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	534	503	408	351	349	364	556	2,109	3,995	1,966	589	465
Max	1,010	777	593	512	584	554	1,398	5,578	7,256	4,771	1,541	1,395
(WY)	(1942)	(1928)	(1996)	(1997)	(1963)	(1943)	(1943)	(1928)	(1996)	(1943)	(1951)	(1941)
Min	298	310	217	200	180	220	123	757	1,768	290	49.5	156
(WY)	(1956)	(1936)	(1937)	(1922)	(1922)	(1924)	(1961)	(1968)	(1987)	(1988)	(1988)	(1988)

* During periods of operation (water years 1921–69, 1987–2007).

SUMMARY STATISTICS						
	Calendar Year 2006		Water Year 2007		Water Years 1921–2007*	
Annual total	292,365		278,883			
Annual mean	801		764		1,017	
Highest annual mean					1,623	1997
Lowest annual mean					644	2001
Highest daily mean	5,390	May 22	6,780	Jun 7	10,600	Jun 2, 1936
Lowest daily mean	66	Aug 26	96	Sep 2	37	May 11, 1961
Annual seven-day minimum	72	Aug 25	101	Aug 28	43	Apr 18, 1961
Maximum peak flow			7,830	Jun 7	11,100	Jun 12, 1997
Maximum peak stage			8.00	Jun 7	9.30	Jun 12, 1997
Instantaneous low flow					36	Apr 22, 1961
Annual runoff (ac-ft)	579,900		553,200		736,700	
10 percent exceeds	1,890		2,180		2,790	
50 percent exceeds	415		381		465	
90 percent exceeds	96		180		270	

* During periods of operation (water years 1921–69, 1987–2007).

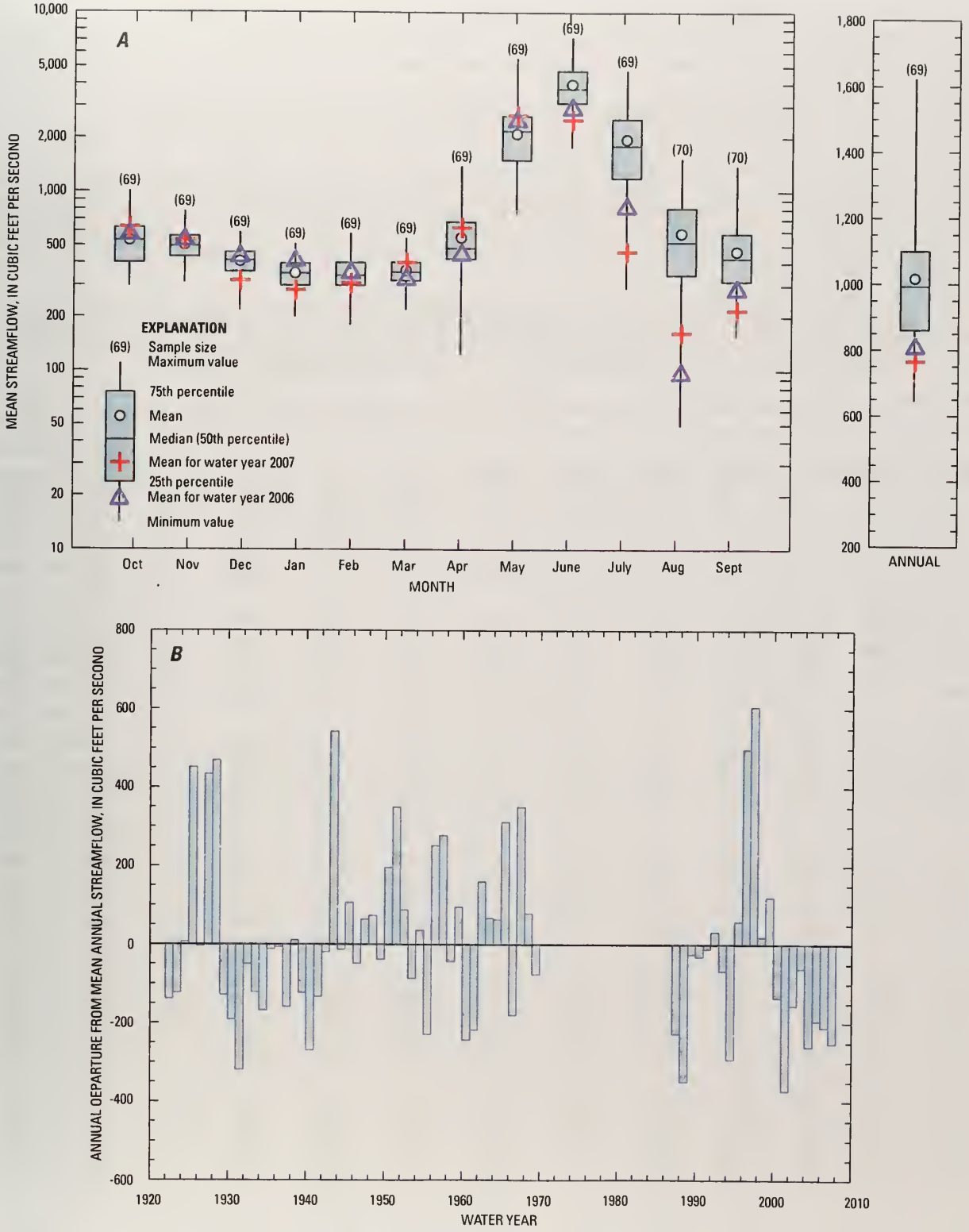

Figure 1. Streamflow data for the Clarks Fork Yellowstone River at Edgar, Mont. (06208500), minus diversions to White Horse Canal, water years 1922–2007: *A*, Statistical distribution of monthly and annual streamflow; *B*, Annual departure from the mean annual streamflow.

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44′09″, long 107°33′24″ referenced to North American Datum of 1927, in SE ¼ NE ¼ NE ¼ sec.19, T.1 S., R.34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream from terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.

DRAINAGE AREA.--1,294 mi².

PERIOD OF RECORD.--June 1953 to September 2007.

REVISED RECORDS.--Water Data Report MT-86-1: 1978.

GAGE.--Water-stage recorder. Elevation of gage is 2,882.29 ft, referenced to the National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage located at site 0.4 mi downstream. Oct. 7, 1953 to May 6, 1963, water-stage recorder located at site 0.3 mi downstream. May 6, 1963 to Nov. 6, 1963, nonrecording gage located at site 0.4 mi downstream. All locations had different elevations. Nov. 7, 1963 to Aug. 15, 1976, water-stage recorder located at site 35 ft downstream at present elevation. Aug. 15, 1976 to Sept. 30, 1979, water-stage recorders were located on each bank downstream from Sarpy Road bridge and were used depending on control conditions.

REMARKS.--Records are good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation include 20,980 acres upstream from station. Discharge values and summary statistics given herein include the flow of terminal wasteway of Agency Canal. U.S. Geological Survey satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year.

Table 2. Daily mean discharge for the Little Bighorn River near Hardin, Mont. (06294000), October 2006 through September 2007.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	87	113	e80	e90	e70	e90	199	317	1,220	579	153	130
2	84	88	e80	e100	e60	e100	242	388	2,070	532	143	130
3	83	84	e100	e100	e70	e110	330	449	2,550	493	140	128
4	88	99	e110	e100	e70	e140	371	572	2,360	451	139	126
5	87	106	e100	e100	e80	e200	334	751	1,950	401	144	125
6	93	109	e100	e100	e90	e250	308	872	1,770	384	144	124
7	89	108	e100	e100	e80	e300	283	1,280	1,920	360	137	116
8	90	106	e110	e100	e80	e350	257	1,130	2,480	349	130	128
9	96	105	e120	e100	e80	e500	244	709	3,340	326	125	152
10	107	111	e110	e100	e80	677	256	637	4,320	314	115	175
11	111	117	e100	e80	e80	930	340	628	3,700	299	118	180
12	117	120	e100	e60	e80	896	532	736	3,070	218	158	189
13	114	115	e100	e70	e80	1,120	418	892	2,710	228	166	175
14	117	114	e100	e70	e80	776	325	1,100	2,480	200	161	172
15	111	112	e100	e80	e90	787	340	1,280	2,270	186	155	178
16	107	120	e80	e90	e90	543	440	1,290	2,120	170	145	184
17	117	116	e70	e100	e90	368	524	1,080	2,020	156	152	182
18	120	116	e80	e100	e90	292	486	993	1,920	142	159	178
19	126	115	e80	e100	e90	282	434	983	1,820	135	163	182
20	120	111	e90	e100	e90	282	630	1,030	1,630	119	163	183
21	124	109	e100	e100	e90	263	833	1,070	1,440	106	152	157
22	148	110	e100	e100	e90	235	485	1,180	1,300	110	152	148
23	154	109	e100	e110	e90	218	389	1,220	1,170	121	146	144
24	139	107	e100	e100	e90	198	338	1,160	1,080	121	151	148
25	128	101	e100	e90	e90	187	316	973	1,010	118	152	140
26	127	e70	e110	e80	e90	179	297	799	936	122	161	143
27	134	e50	e100	e80	e90	172	288	692	850	152	152	138
28	141	e40	e100	e80	e90	177	285	624	769	186	142	134
29	128	e50	e80	e80	--	209	277	630	690	185	132	133
30	123	e60	e70	e70	--	235	278	794	612	173	136	133
31	118	--	e80	e80	--	197	--	900	--	162	134	--
Total	3,528	2,991	2,950	2,810	2,340	11,263	11,079	27,159	57,577	7,598	4,520	4,555
Mean	114	99.7	95.2	90.6	83.6	363	369	876	1,919	245	146	152
Max	154	120	120	110	90	1,120	833	1,290	4,320	579	166	189
Min	83	40	70	60	60	90	199	317	612	106	115	116
Ac-ft	7,000	5,930	5,850	5,570	4,640	22,340	21,980	53,870	114,200	15,070	8,970	9,030

Table 2. Daily mean discharge for the Little Bighorn River near Hardin, Mont. (06294000), October 2006 through September 2007.—Continued

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954–2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	150	149	132	136	193	303	304	598	807	253	114	124
Max	276	248	223	366	610	987	748	2,852	1,981	1,333	382	267
(WY)	(1979)	(1979)	(1979)	(1975)	(1971)	(1972)	(1965)	(1978)	(1968)	(1975)	(1975)	(1978)
Min	60.7	82.6	65.6	50.5	68.5	71.1	54.8	71.9	117	8.50	2.46	19.1
(WY)	(2002)	(2002)	(2002)	(2005)	(2005)	(2002)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)

SUMMARY STATISTICS

	Calendar Year 2006		Water Year 2007		Water Years 1954–2007	
Annual total	41,368.2		138,370			
Annual mean	113		379		272	
Highest annual mean					676	1975
Lowest annual mean					70.4	1961
Highest daily mean	759	May 25	4,320	Jun 10	15,800	May 20, 1978
Lowest daily mean	1.1	Aug 22	40	Nov 28	0.30	Aug 5, 1961
Annual seven-day minimum	1.5	Aug 17	61	Nov 26	0.40	Aug 3, 1961
Maximum peak flow			4,580	Jun 10	[a]22,600	May 19, 1978
Maximum peak stage			8.31	Jun 10	[b]11.78	Mar 20, 1960
Instantaneous low flow					[c]0.20	Aug 7, 1961
Annual runoff (ac-ft)	82,050		274,500		196,900	
10 percent exceeds	173		1,020		589	
50 percent exceeds	109		140		160	
90 percent exceeds	6.8		80		70	

[a] Gage height, 11.20 ft.

[b] Site and datum then in use.

[c] Result of discharge measurement.

06294500 Bighorn River above Tullock Creek, near Bighorn, Mont.

LOCATION.--Lat 46°07′29″, long 107°28′06″ referenced to North American Datum of 1927, in SE ¼ SE ¼ NE ¼ sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 1.9 mi upstream from Tullock Creek, 3.6 mi southwest of Bighorn, 4.5 mi southeast of Custer, and at river mile 3.0.

DRAINAGE AREA.--22,414 mi². Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi².

PERIOD OF RECORD.--October 1981 to September 2007. Previously published as "06294700 Bighorn River at Bighorn, MT" from 1956-81, and as "06294700 Bighorn River near Custer" from 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft, referenced to the National Geodetic Vertical Datum of 1929. May 11, 1945 to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945 to Oct. 6, 1955, water-stage recorder located 1.7 mi upstream at different elevation. Oct. 7, 1955 to Sept. 30, 1981, located at site 2.3 mi downstream at different elevation.

REMARKS.--Records are good except those for estimated daily discharges, which are poor. Since November 1965, flow has been regulated by Bighorn Lake (usable contents, 1,312,000 acre-ft). Major regulation prior to November 1965 occurred from 14 reservoirs in Wyoming and one in Montana with a combined usable contents of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres occurs upstream from the station. U.S. Army Corps of Engineers satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year.

Table 3. Daily mean discharge for the Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), October 2006 through September 2007.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1,560	1,540	e1,600	e1,800	e2,000	1,770	1,900	1,950	4,180	2,130	1,950	2,140
2	1,540	1,530	e1,500	e1,900	e1,900	1,760	2,320	2,030	5,570	2,130	1,930	2,150
3	1,530	1,530	e1,500	1,890	e1,900	1,730	2,820	2,120	5,190	2,100	1,970	2,150
4	1,480	1,550	e1,600	1,940	e1,900	1,740	2,630	2,290	4,680	2,060	2,020	2,170
5	1,420	1,560	e1,600	1,970	e1,900	1,740	2,440	2,490	3,860	2,070	2,020	2,160
6	1,380	1,580	e1,600	1,980	e1,900	1,790	2,290	2,770	3,500	2,040	2,010	2,110
7	1,390	1,580	e1,700	2,010	e1,900	1,890	2,140	3,030	3,890	2,000	1,950	2,110
8	1,520	1,590	1,870	2,010	e1,900	2,130	2,060	3,080	7,080	2,100	1,930	2,090
9	1,480	1,590	1,770	2,020	e1,900	2,250	1,980	2,560	7,130	2,020	1,900	2,100
10	1,510	1,600	1,790	2,010	e1,900	2,480	2,100	2,320	6,990	2,010	1,900	2,130
11	1,510	1,610	1,810	1,960	e1,900	2,650	2,180	2,290	6,460	1,950	1,950	2,130
12	1,520	1,620	1,760	e2,000	e1,900	2,700	2,450	2,310	4,980	1,930	1,980	2,130
13	1,510	1,610	1,660	e2,000	e1,900	2,820	2,380	2,470	4,330	1,900	2,060	2,110
14	1,480	1,620	1,680	e2,100	e1,900	2,630	2,160	2,660	3,970	1,930	2,030	2,050
15	1,440	1,590	1,700	e2,100	e2,000	2,570	2,100	2,770	3,670	1,930	2,040	2,030
16	1,440	1,470	1,720	e2,100	e2,100	2,370	2,190	2,840	3,450	1,930	2,050	2,040
17	1,520	1,480	1,740	e2,000	e2,100	2,140	2,310	2,690	3,540	1,900	2,090	2,030
18	1,600	1,470	e1,700	e1,900	e2,100	1,970	2,330	2,530	3,410	1,900	2,140	2,000
19	1,280	1,470	e1,700	e1,900	e2,100	1,910	2,360	2,490	3,280	1,900	2,180	2,030
20	1,660	1,480	e1,800	e1,900	e2,100	1,910	2,570	2,530	3,060	1,870	2,180	2,000
21	1,720	1,480	1,770	e1,900	e2,100	1,890	3,320	2,570	2,830	1,870	2,120	1,970
22	1,810	1,480	1,740	e1,900	e2,100	1,850	2,670	3,020	2,860	1,880	2,080	1,910
23	1,750	1,490	1,620	e1,900	2,130	1,830	2,300	3,220	2,770	1,890	2,090	1,890
24	1,650	1,490	1,640	e1,900	2,020	1,800	2,160	3,180	2,700	1,890	2,120	1,960
25	1,610	1,490	1,660	e1,900	1,940	1,780	2,080	3,210	2,610	1,960	2,110	1,890
26	1,600	1,490	1,700	e2,000	1,900	1,770	2,030	2,850	2,470	1,910	2,120	1,890
27	1,610	1,470	1,720	e2,000	1,860	1,750	2,020	2,620	2,370	2,000	2,120	1,820
28	1,590	1,540	1,800	e2,000	1,830	1,780	1,990	2,480	2,310	2,010	2,080	1,790
29	1,590	e1,500	1,800	e2,000	--	2,000	1,970	2,450	2,300	1,980	2,090	1,780
30	1,590	e1,500	1,800	e2,000	--	1,980	1,940	2,580	2,170	2,020	2,100	1,760
31	1,570	--	e1,800	e2,000	--	1,910	--	2,850	--	1,970	2,140	--
Total	47,860	46,000	52,850	60,990	55,080	63,290	68,190	81,250	117,610	61,180	63,450	60,520
Mean	1,544	1,533	1,705	1,967	1,967	2,042	2,273	2,621	3,920	1,974	2,047	2,017
Max	1,810	1,620	1,870	2,100	2,130	2,820	3,320	3,220	7,130	2,130	2,180	2,170
Min	1,280	1,470	1,500	1,800	1,830	1,730	1,900	1,950	2,170	1,870	1,900	1,760
Ac-ft	94,930	91,240	104,800	121,000	109,300	125,500	135,300	161,200	233,300	121,400	125,900	120,000

Table 3. Daily mean discharge for the Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), October 2006 through September 2007.—Continued

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945–2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	3,115	3,190	3,055	2,951	3,103	3,565	3,434	4,221	6,672	5,107	2,771	2,764
Max	5,546	5,599	4,907	5,478	5,314	6,580	7,881	9,102	15,180	19,090	6,972	4,952
(WY)	(1972)	(1974)	(1968)	(1968)	(1971)	(1972)	(1997)	(1947)	(1948)	(1967)	(1997)	(1973)
Min	1,103	1,223	1,280	1,382	1,544	908	1,063	1,304	1,050	707	868	1,009
(WY)	(2003)	(1978)	(1961)	(1961)	(2003)	(1966)	(1966)	(1966)	(1966)	(1960)	(1961)	(1966)

SUMMARY STATISTICS

	Calendar Year 2006		Water Year 2007		Water Years 1945–2007	
Annual total	750,840		778,270			
Annual mean	2,057		2,132		3,645	
Highest annual mean					5,594	1997
Lowest annual mean					1,474	2003
Highest daily mean	3,570	Apr 1	7,130	Jun 9	50,000	May 20, 1978
Lowest daily mean	1,140	Sep 12	1,280	Oct 19	400	Apr 4, 1967
Annual seven-day minimum	1,210	Sep 6	1,450	Oct 4	528	May 6, 1961
Maximum peak flow			[a]8,420	Jun 8	[d]59,200	May 20, 1978
Maximum peak stage			[b]6.17	Dec 1	[d]14.15	May 20, 1978
Instantaneous low flow			[c]847	Oct 19	[e]275	Nov 15, 1959
Annual runoff (ac-ft)	1,489,000		1,544,000		2,641,000	
10 percent exceeds	2,650		2,770		6,140	
50 percent exceeds	2,220		1,980		3,060	
90 percent exceeds	1,480		1,540		1,600	

	Water Years 1946–1961*		Water Years 1967–2007**	
Annual mean	3,358		3,635	
Highest annual mean	5,501	1947	5,594	1997
Lowest annual mean	1,623	1961	1,474	2003
Highest daily mean	25,700	Jun 23, 1947	50,000	May 20, 1978
Lowest daily mean	462	May 12, 1962	400	Apr 4, 1967
Annual seven-day minimum	528	May 6, 1961	843	Nov 18, 1977
Maximum peak flow	[f]26,200	Jun 24, 1947	[d]59,200	May 20, 1978
Maximum peak stage	[d]10.65	May 24, 1947	[d]14.15	May 20, 1978
Instantaneous low flow	[e]275	Nov 15, 1959		
Annual runoff (ac-ft)	2,578,000		2,663,300	
10 percent exceeds	6,200		6,030	
50 percent exceeds	2,810		3,200	
90 percent exceeds	1,500		1,670	

* Prior to construction of Yellowtail Dam.
** After completion of Yellowtail Dam.
[a] Gage height, 4.65 ft.
[b] Backwater from ice.
[c] Gage height, 0.03 ft.
[d] Result of ice jam, at different site and datum.
[e] Prior to construction of Yellowtail Dam.
[f] Gage height, 8.79 ft, at different site and datum.

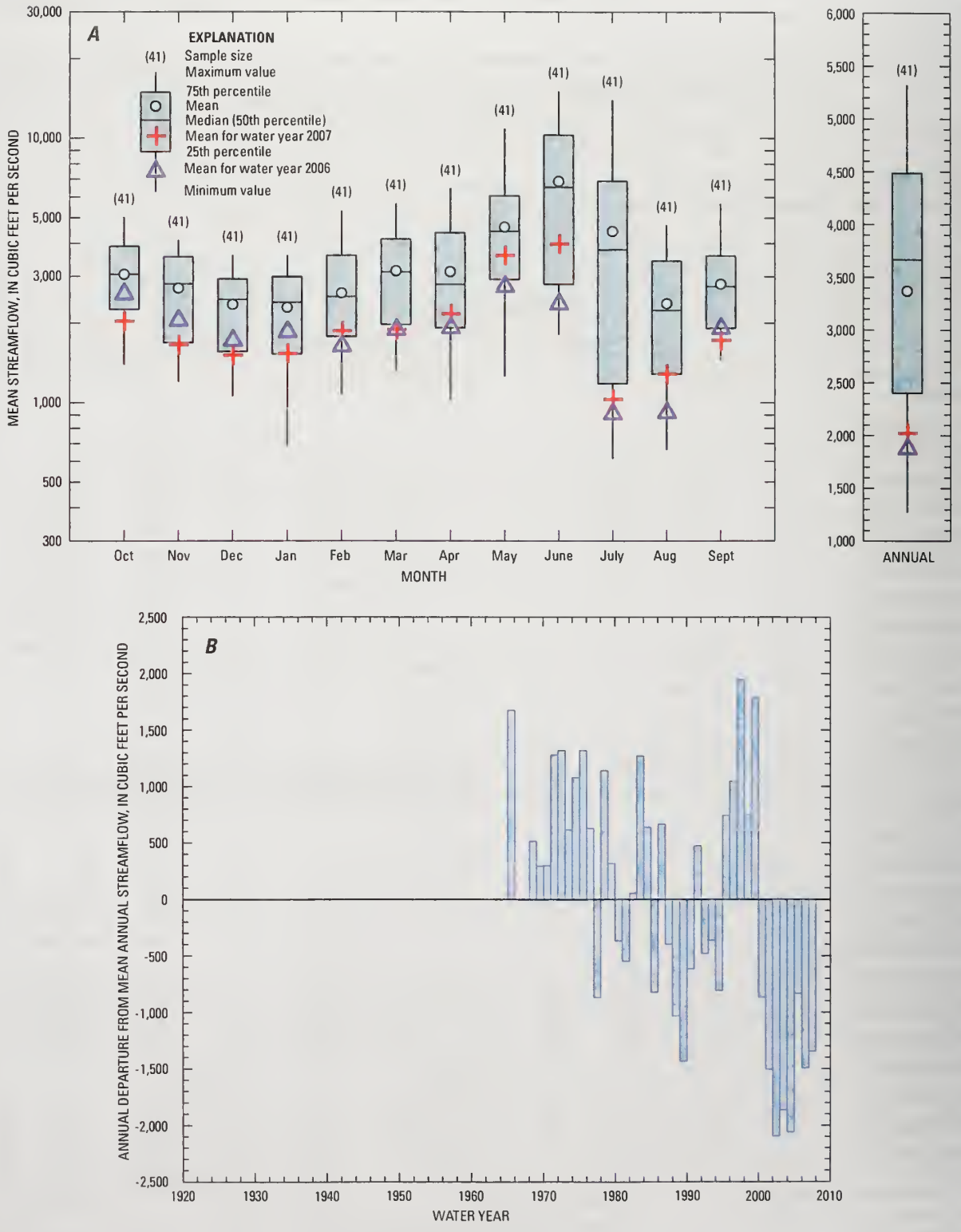

Figure 2. Streamflow data for the Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), minus Little Bighorn River near Hardin, Mont. (06294000); adjusted for change in contents in Bighorn Lake, water years 1965–2007: *A*, Statistical distribution of monthly and annual streamflow; *B*, Annual departure from the mean annual streamflow.

06308500 Tongue River at Miles City, Mont.

LOCATION.--Lat 46°23′05″, long 105°50′41″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ sec.4, T.7 N., R.47 E., Custer County, Hydrologic Unit 10090102, on right bank 1.5 mi south of Miles City and at river mile 2.3.

DRAINAGE AREA.--5,397 mi². Area at site used prior to Oct. 4, 1995, 5,379 mi².

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to September 2007. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. April 1946 to Oct. 4, 1995, at site 2.5 mi upstream from present site. Flows at present site are equivalent with flows at site operated from 1946. Monthly discharge only for some periods, published in Water Supply Paper (WSP) 1309.

REVISED RECORDS.-- WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,360 ft, referenced to the National Geodetic Vertical Datum of 1929. April 1938 to April 1942, nonrecording gage located at site 8 mi upstream from present site at different elevation. April 1946 to Sept. 30, 1963, located at elevation 1.00 ft higher than present site. Oct. 4, 1995, gage was moved 2.5 miles downstream.

REMARKS.--Records are good except those for estimated daily discharges, which are poor. Flow is regulated by Tongue River Reservoir (station 06307000) with usable contents of 79,070 acre-ft, and many small reservoirs in Wyoming with combined capacity about 15,000 acre-ft. Diversions for irrigation include about 100,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

Table 4. Daily mean discharge for the Tongue River at Miles City, Mont. (06308500), October 2006 through September 2007.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	49	e70	e90	e70	e90	e120	539	514	2,130	640	105	155
2	48	e70	e100	e80	e80	e100	576	506	1,870	592	110	149
3	53	e100	e90	e100	e80	e100	804	517	1,640	511	96	172
4	56	e100	e100	e90	e100	e80	676	617	1,760	441	87	166
5	74	98	e100	e80	e130	e200	565	661	1,920	360	92	164
6	62	93	e80	e80	e120	e400	529	1,640	1,940	311	99	168
7	57	93	e80	e80	e120	e300	505	2,880	4,620	293	67	186
8	56	92	e100	e80	e120	e250	492	1,570	6,130	276	88	223
9	56	94	e100	e80	e120	e230	495	1,210	3,570	253	110	236
10	e60	94	e90	e70	e120	e250	528	1,230	3,020	236	108	234
11	e60	94	e90	e50	e120	e400	554	1,170	3,630	212	122	212
12	e60	93	e100	e40	e120	e300	560	1,130	4,270	192	158	243
13	63	93	e100	e45	e120	247	546	1,140	3,990	167	190	234
14	65	92	e100	e50	e120	235	533	2,050	3,420	147	129	212
15	57	95	e100	e60	e110	223	530	1,600	3,100	138	119	196
16	55	90	e80	e70	e110	203	526	1,830	2,920	120	133	195
17	64	89	e70	e80	e110	198	522	2,290	2,690	100	e100	198
18	62	89	e60	e90	e120	211	516	2,530	2,520	82	e150	201
19	67	102	e70	e100	e200	225	535	2,380	2,420	68	e200	216
20	65	111	e70	e120	e300	240	570	2,250	2,330	59	e200	227
21	73	111	e70	e120	e400	254	556	2,240	2,200	66	210	214
22	115	111	e80	e110	e400	267	542	2,310	1,950	90	202	208
23	119	110	e70	e120	e300	277	531	2,380	1,640	104	191	201
24	106	112	e80	e130	e200	279	537	2,500	1,440	110	209	190
25	101	120	e80	e120	e180	281	535	2,460	1,330	95	225	186
26	99	91	e90	e120	e160	284	535	2,180	1,130	96	159	177
27	96	e80	e100	e110	e150	279	530	1,940	1,080	104	155	163
28	96	e75	e90	e100	e130	300	527	1,750	949	117	181	156
29	96	e70	e80	e100	--	367	526	1,700	780	126	178	151
30	97	e80	e70	e100	--	406	520	1,610	701	126	169	149
31	e80	--	e60	e100	--	442	--	1,770	--	117	160	--
Total	2,267	2,812	2,640	2,745	4,430	7,948	16,440	52,555	73,090	6,349	4,502	5,782
Mean	73.1	93.7	85.2	88.5	158	256	548	1,695	2,436	205	145	193
Max	119	120	100	130	400	442	804	2,880	6,130	640	225	243
Min	48	70	60	40	80	80	492	506	701	59	67	149
Ac-ft	4,500	5,580	5,240	5,440	8,790	15,760	32,610	104,200	145,000	12,590	8,930	11,470

Table 4. Daily mean discharge for the Tongue River at Miles City, Mont. (06308500), October 2006 through September 2007.—Continued

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938–2007, BY WATER YEAR (WY) *												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	237	246	186	190	268	511	427	689	1,250	445	175	193
Max	694	585	423	529	1,794	1,783	1,693	2,983	3,825	2,207	700	599
(WY)	(1972)	(1942)	(1950)	(1999)	(1971)	(1971)	(1965)	(1978)	(1978)	(1975)	(1975)	(1968)
Min	10.3	60.9	68.0	65.3	74.5	74.5	12.5	29.2	41.9	12.6	6.08	2.40
(WY)	(1961)	(1989)	(1990)	(2005)	(2003)	(2002)	(1961)	(1961)	(2002)	(1960)	(1949)	(1938)

SUMMARY STATISTICS						
	Calendar Year 2006		Water Year 2007		Water Years 1938–2007*	
Annual total	39,988.1		181,560			
Annual mean	110		497		398	
Highest annual mean					986	1978
Lowest annual mean					57.2	1961
Highest daily mean	1,360	Apr 20	6,130	Jun 8	9,290	Jun 15, 1962
Lowest daily mean	6.9	Sep 8	40	Jan 12	0.00	Jul 9, 1940
Annual seven-day minimum	7.2	Sep 4	55	Jan 10	0.00	Jul 9, 1940
Maximum peak flow			8,520	Jun 8	[a]13,300	Jun 15, 1962
Maximum peak stage			10.97	Jun 8	[b]13.27	Mar 19, 1960
Annual runoff (ac-ft)	79,320		360,100		288,300	
10 percent exceeds	230		1,750		900	
50 percent exceeds	90		150		216	
90 percent exceeds	12		70		63	

* During periods of operation (April 1938 to April 1942, April 1946–2007).

[a] Gage height, 11.33 ft, at previous site and datum.

[b] Ice jam, at previous site and datum used from 1963 to 1995.

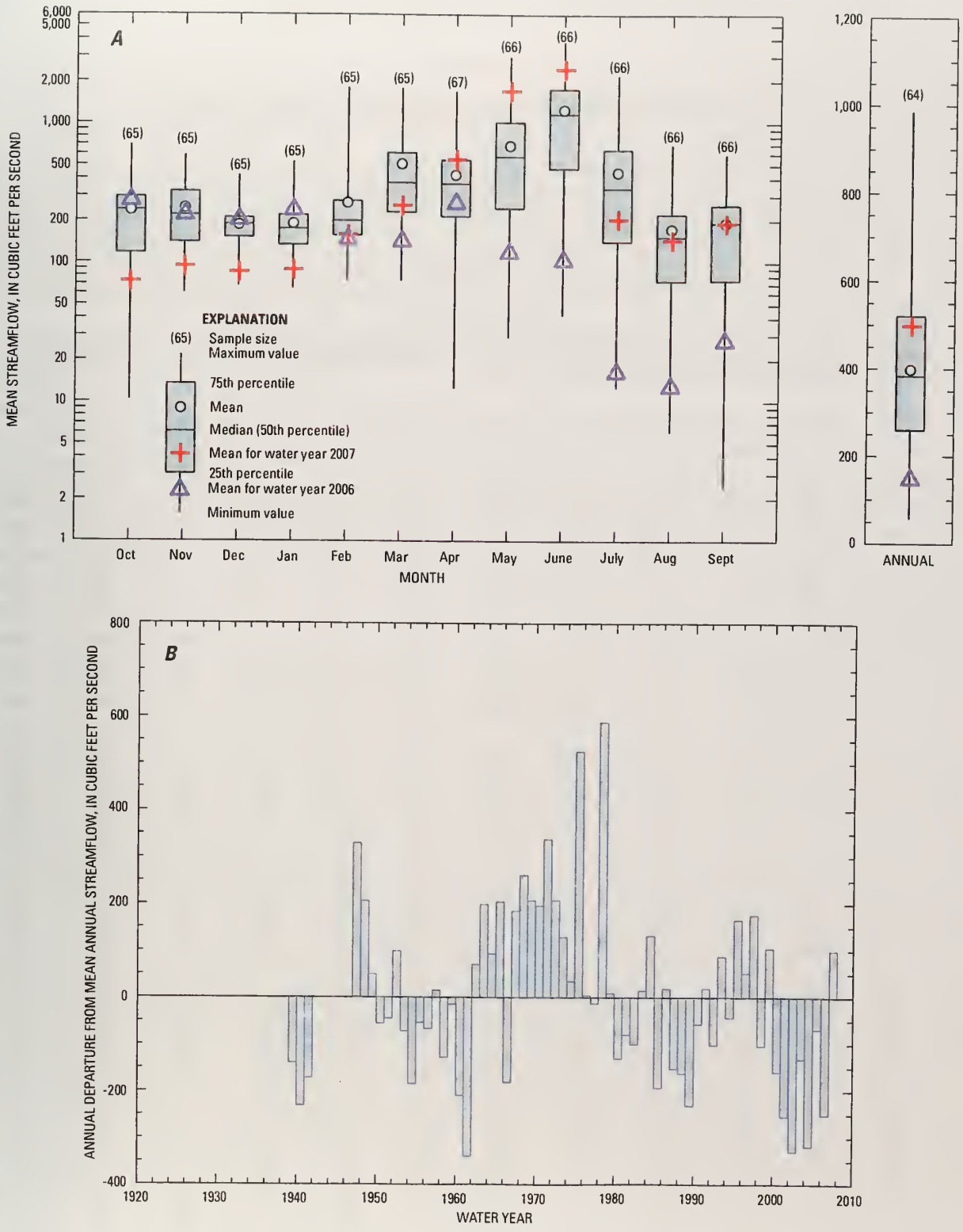

Figure 3. Streamflow data for the Tongue River at Miles City, Mont. (06308500), water years 1939–2007: *A*, Statistical distribution of monthly and annual streamflow; *B*, Annual departure from the mean annual streamflow.

06326500 Powder River near Locate, Mont.

LOCATION.--Lat 46°25′48″, long 105°18′34″ referenced to North American Datum of 1927, in SW ¼ SW ¼ SE ¼ sec.23, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank at downstream side of bridge on U.S. Highway 12, 0.1 mi west of Locate, and 25 mi east of Miles City, and at river mile 29.4.

DRAINAGE AREA.--13,068 mi².

PERIOD OF RECORD.--March 1938 to September 2007.

REVISED RECORDS.--Water Supply Paper (WSP) 926: 1939. WSP 1309: 1938-39, maximum discharge. WSP 1729: Drainage area. Water Data Report MT-04-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,384.79 ft, referenced to the National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage located at bridge 1.5 mi upstream, and July 11, 1947 to Sept. 30, 1965, water-stage recorder located at site near upstream bridge at different elevation. Oct. 1, 1965 to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966 to Mar. 21, 1978, water-stage recorder located at present site and elevation. Mar. 22, 1978 to Apr. 23, 1981, water-stage recorder located 1.5 mi upstream at different elevation, Apr. 24 to Aug. 20, 1981, water-stage recorder located at present site and elevation, and Aug. 21, 1981 to Sept. 30, 1981, water-stage recorder located 1.5 mi upstream at different elevation. Oct. 1, 1981 to Apr. 5, 1995 water-stage recorder located at site 1.5 miles downstream at different elevation. Apr. 7, 1995 to present, water-stage recorders located on each bank and used depending on control conditions.

REMARKS.--Records are fair except those for estimated daily discharges, which are poor. Some regulation occurs by three reservoirs in Wyoming with combined usable contents of 36,800 acre-ft. Diversions for irrigation include about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

Table 5. Daily mean discharge for the Powder River near Locate, Mont. (06326500), October 2006 through September 2007.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	46	e80	e90	e80	e50	e90	558	323	978	743	555	64
2	55	e90	e80	e90	e50	e90	642	311	956	657	1,160	64
3	83	e100	e80	e100	e50	e80	866	307	1,120	613	834	57
4	165	e100	e120	e90	e60	e200	742	368	1,110	578	687	57
5	128	e100	e120	e80	e80	e500	698	337	1,240	527	560	54
6	107	e110	e90	e80	e70	e500	642	1,430	1,200	483	475	52
7	95	e150	e90	e90	e60	e500	913	3,090	3,380	419	401	60
8	94	e130	e110	e90	e60	e400	962	4,840	4,540	393	347	81
9	92	e120	e110	e80	e60	e400	902	4,360	3,590	413	267	90
10	89	e100	e100	e70	e60	e400	815	4,280	4,040	355	229	99
11	e70	e100	e100	e60	e60	e400	703	3,370	4,090	277	247	94
12	e40	e100	e110	e50	e60	e1,200	590	2,170	3,600	232	239	89
13	e50	e100	e120	e60	e60	e1,000	515	1,870	2,700	205	187	85
14	93	e100	e120	e60	e60	e1,000	494	2,240	2,350	181	177	93
15	94	e90	e120	e60	e60	970	442	1,810	2,130	169	169	101
16	97	e100	e100	e60	e60	947	619	1,930	1,940	126	134	104
17	145	e100	e90	e60	e60	824	538	1,880	1,780	112	119	104
18	120	e100	e80	e60	e60	697	489	1,640	1,740	95	122	85
19	97	e100	e90	e60	e60	554	390	1,400	1,650	92	110	85
20	99	e100	e100	e60	e70	531	437	1,280	1,620	88	103	85
21	111	e100	e100	e60	e90	549	421	1,170	1,560	76	103	90
22	128	e100	e100	e60	e100	509	383	1,140	1,560	62	95	97
23	124	e100	e100	e60	e90	488	414	1,170	1,470	53	87	113
24	e110	e100	e100	e60	e90	445	462	1,240	1,350	47	85	117
25	e100	e100	e100	e60	e90	427	467	1,260	1,240	39	93	110
26	e100	e100	e100	e60	e90	430	455	1,230	1,160	37	98	116
27	e100	e100	e110	e60	e90	400	460	1,100	1,050	36	98	149
28	e100	e90	e100	e60	e90	422	436	987	999	35	94	161
29	e100	e70	e100	e60	--	480	369	931	908	56	99	159
30	e90	e80	e80	e60	--	470	337	845	820	147	93	134
31	e80	--	e70	e60	--	509	--	933	--	142	76	--
Total	3,002	3,010	3,080	2,100	1,940	16,412	17,161	51,242	57,871	7,488	8,143	2,849
Mean	96.8	100	99.4	67.7	69.3	529	572	1,653	1,929	242	263	95.0
Max	165	150	120	100	100	1,200	962	4,840	4,540	743	1,160	161
Min	40	70	70	50	50	80	337	307	820	35	76	52
Ac-ft	5,950	5,970	6,110	4,170	3,850	32,550	34,040	101,600	114,800	14,850	16,150	5,650

Table 5. Daily mean discharge for the Powder River near Locate, Mont. (06326500), October 2006 through September 2007.—Continued

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-ft; e, estimated; Max, maximum; Min, minimum; WY, water year. Symbol: --, no data]

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930–2007, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	243	214	147	142	413	1,181	726	1,130	1,561	542	206	162
Max	921	790	417	476	3,850	4,627	3,062	5,970	8,045	2,015	1,096	898
(WY)	(1941)	(1999)	(1942)	(1981)	(1943)	(1972)	(1965)	(1978)	(1944)	(1993)	(1941)	(1941)
Min	1.77	12.5	12.5	4.53	2.82	80.2	109	51.2	25.9	9.34	1.30	0.19
(WY)	(1961)	(1961)	(1961)	(1950)	(1950)	(1950)	(1961)	(2004)	(2004)	(2004)	(1988)	(1960)

SUMMARY STATISTICS						
	Calendar Year 2006		Water Year 2007		Water Years 1939–2007	
Annual total	87,318.00		174,298			
Annual mean	239		478		555	
Highest annual mean					1,622	1944
Lowest annual mean					79.1	2004
Highest daily mean	3,120	Apr 20	4,840	May 8	26,000	Feb 19, 1943
Lowest daily mean	0.00	Sep 1	35	Jul 28	0.00	Jan 16, 1950
Annual seven-day minimum	0.04	Aug 29	43	Jul 23	0.0	Jan 16, 1950
Maximum peak flow			5,940	Jun 7	[b]31,000	Feb 19, 1943
Maximum peak stage			6.14	Jun 7	[c]12.20	Mar 16, 1978
Instantaneous low flow			[a]31	Jul 28	[d]0.00	Many days
Annual runoff (ac-ft)	173,200		345,700		402,400	
10 percent exceeds	552		1,240		1,300	
50 percent exceeds	120		110		227	
90 percent exceeds	2.4		60		39	

[a] Gage height, 0.74 ft.

[b] Gage height, 11.23 ft, observed.

[c] Backwater from ice.

[d] On many days in 1950, 1960–61, 1998, and 2006.

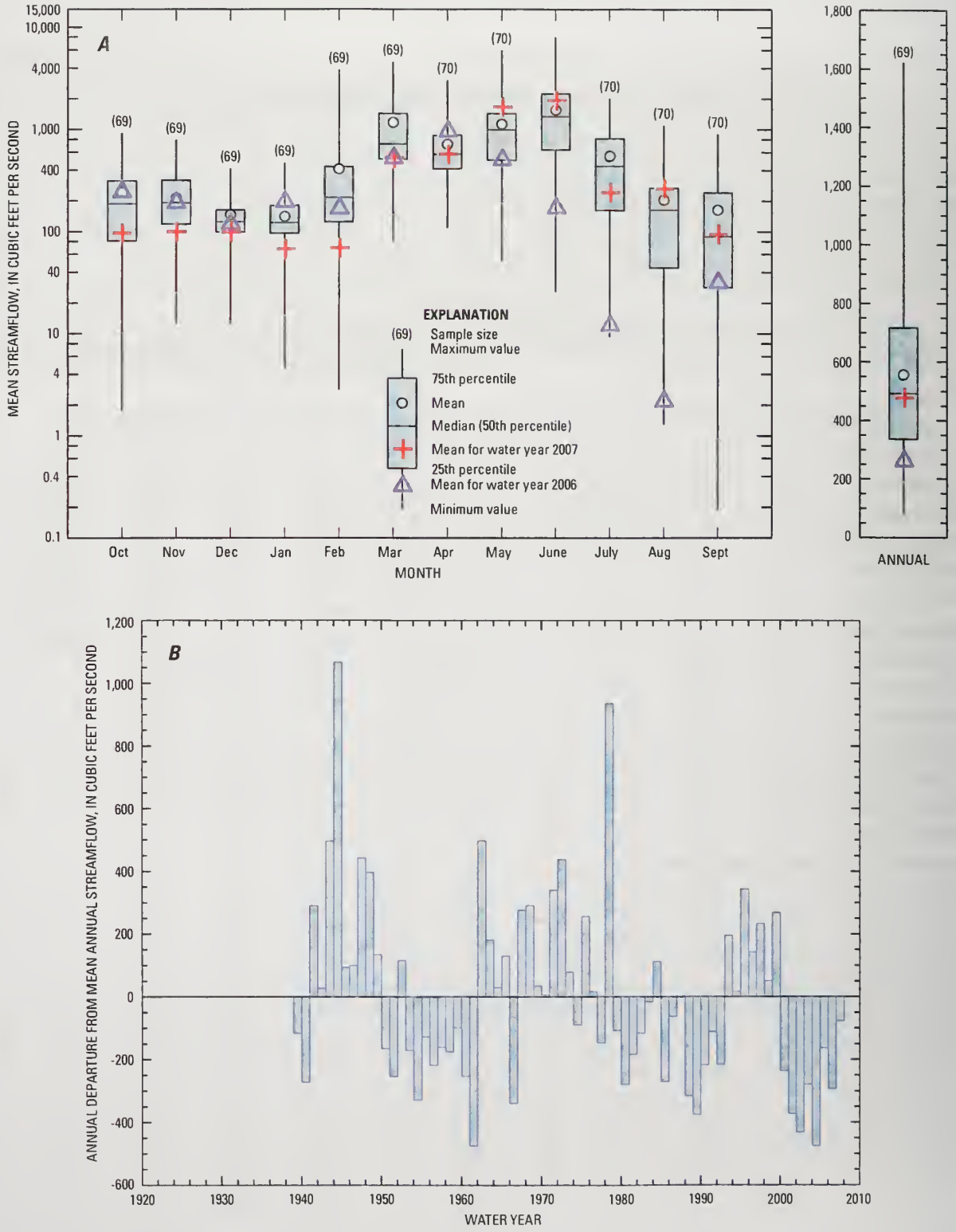

Figure 4. Streamflow data for the Powder River near Locate, Mont. (06326500), water years 1939–2007: *A*, Statistical distribution of monthly and annual streamflow; *B*, Annual departure from the mean annual streamflow.

Month-End Contents for Yellowstone River Compact Reservoirs[1] Completed after January 1, 1950

06258900 Boysen Reservoir, Wyo.

LOCATION.--Lat 43°25'00", long 108°10'37" (NAD 27), in NW$^1/_4$NW$^1/_4$ sec. 16, T.5 N., R.6 E., Fremont County, Hydrologic Unit 10080005, at dam on Wind River and 13 mi north of Shoshoni, Wyo.

DRAINAGE AREA.--7,700 mi^2.

PERIOD OF RECORD.--October 1951 to September 2007 (month-end contents only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Bureau of Reclamation).

REMARKS.--Reservoir is formed by rock-fill dam completed in October 1951. Storage began Oct. 11, 1951. Usable contents is 701,500 acre-ft between elevation 4,657.00 ft, invert of penstock pipe, and 4,725.00 ft, top of spillway gate. Dead storage is 40,080 acre-ft below elevation 4,657.00 ft. Prior to Jan. 1, 1966, usable contents was 757,800 acre-ft and dead storage was 62,000 acre-ft at same elevations. Between January 1966 and October 1996, usable contents was 742,100 acre-ft and dead storage was 59,880 acre-ft, at same elevations. Crest of dam is at elevation 4,758.00 ft. Water used for irrigation, flood control, and power generation.

COOPERATION.--Elevations and contents table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 862,500 acre-ft, July 6, 7, 1967, elevation, 4,730.83 ft; minimum daily contents since normal use of water started, 191,900 acre-ft, Mar. 18, 19, 1956, elevation, 4,684.18 ft, capacity table then in use.

EXTREMES FOR WATER YEAR 2007.--Maximum daily contents, 453,300 acre-ft, June 18, elevation, 4,710.05 ft; minimum daily contents, 349,100 acre-ft, Sept. 27, elevation, 4,701.83 ft.

Table 6. Month-end contents for Boysen Reservoir, Wyo.

[Symbol: --, no data.]

Date	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2006	4,706.63	407,700	--
October 31	4,708.26	429,000	21,300
November 30	4,709.09	440,200	11,200
December 31	4,708.67	434,500	-5,700
January 31, 2007	4,707.81	423,100	-11,400
February 28	4,707.53	419,400	-3,700
March 31	4,707.90	424,200	4,800
April 30	4,707.80	422,900	-1,300
May 31	4,709.29	442,900	20,000
June 30	4,708.95	438,300	-4,600
July 31	4,705.98	399,400	-38,900
August 31	4,703.38	367,500	-31,900
September 30, 2007	4,701.87	349,600	-17,900
2007 water year			-58,100

[1]Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

06260300 Anchor Reservoir, Wyo.

LOCATION.--Lat 43°39'50", long 108°49'27" (NAD 27), in sec. 26, T.43 N., R.100 W., Hot Springs County, Hydrologic Unit 10080007, at dam on South Fork Owl Creek, 2 mi downstream from Middle Fork, 3 mi southeast of Anchor, and 32 mi west of Thermopolis, Wyo.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--November 1960 to September 2007 (month-end contents only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (Bureau of Reclamation benchmark).

REMARKS.--Reservoir is formed by concrete arch dam completed in 1960. Usable contents, 17,410 acre-ft (revised) between elevation 6,343.75 ft, invert of river outlet, and 6,441.00 ft, spillway crest, including 68 acre-ft below elevation 6,343.75 ft. Prior to Oct. 1, 1971, usable contents was 17,280 acre-ft, including 149 acre-ft below the invert. Water is used for irrigation of land in Owl Creek basin.

COOPERATION.--Elevations and contents table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 9,250 acre-ft, July 4, 1967, elevation, 6,418.52 ft; no usable contents on many days some years.

EXTREMES FOR WATER YEAR 2007.--Maximum daily contents, 915 acre-ft, May 16, elevation, 6,370.00 ft; minimum daily contents, 254 acre-ft, many days, elevation, 6,355.00 ft.

Table 7. Month-end contents for Anchor Reservoir, Wyo.

[Symbol: --, no data.]

Date	Water-surface elevation, In feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2006	6,355.50	233	--
October 31	6,355.00	254	21
November 30	6,356.00	283	29
December 31	6,355.50	268	-15
January 31, 2007	6,355.00	254	-14
February 28	6,357.00	314	60
March 31	6,360.80	444	130
April 30	6,369.00	851	407
May 31	6,356.00	283	-568
June 30	6,355.00	254	-29
July 31	6,359.00	379	125
August 31	6,355.00	254	-125
September 30, 2007	6,355.00	254	0
2007 water year			21

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18′27″, long 107°57′26″ referenced to North American Datum of 1927, in SW ¼ SE ¼ sec.18, T.6 S., R.30 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southwest of St. Xavier, and at river mile 86.6.

DRAINAGE AREA.--19,626 mi².

PERIOD OF RECORD.--November 1965 to September 2007 (month-end contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file at the U.S. Geological Survey, Montana Water Science Center in Helena, Mont.

GAGE.--Water-stage recorder located in powerhouse control room. Elevation of gage is 3,296.5 ft (NGVD 29) (levels by Bureau of Reclamation).

COOPERATION.--Elevations and contents table furnished by Bureau of Reclamation.

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961 and was completed in 1967. Storage began Nov. 3, 1965. Usable contents is 1,312,000 acre-ft, between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest is 3,593.00 ft. Normal maximum operating level is 1,097,000 acre-ft, between elevation, 3,640.00 ft and 3,657.00 ft. Minimum operating level is 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage is 16,010 acre-ft, below elevation 3,296.50 ft. All elevations are referenced to the National Geodetic Vertical Datum of 1929. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 519,400 acre-ft, Mar. 11, 2003, elevation 3,572.81 ft.

EXTREMES FOR WATER YEAR 2007.--Maximum contents, 1,032,000 acre-ft, June 25, and 26, elevation, 3,638.22 ft; minimum, 746,500 acre-ft, Oct. 1, elevation, 3,603.19 ft.

Table 8. Month-end contents for Bighorn Lake, Mont.

[Symbol: --, no data.]

Date	Water-surface elevation, In feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2006	3,603.07	745,800	--
October 31	3,609.42	783,600	37,800
November 30	3,611.54	797,100	13,500
December 31	3,610.62	791,200	–5,900
January 31, 2007	3,607.27	770,300	–20,900
February 28	3,607.09	769,300	–1,000
March 31	3,609.20	782,200	12,900
April 30	3,611.65	797,800	15,600
May 31	3,626.58	911,900	114,100
June 30	3,638.03	1,030,000	118,100
July 31	3,634.27	987,100	–42,900
August 31	3,630.58	949,100	–38,000
September 30, 2007	3,629.71	940,700	–8,400
2007 water year			194,900

Month-End Contents for Yellowstone River Compact Reservoirs[1] Existing on January 1, 1950

The extent, if any, to which the use of reservoirs in this section may be subject to Compact allocations was not determined. As a matter of hydrologic interest, the month-end usable contents in acre-ft of four reservoirs are given. The first three reservoirs are in the Bighorn River Basin, Wyoming, and data on contents were furnished by the Bureau of Reclamation. The Tongue River Reservoir in Montana is operated under the supervision of the Water Resources Division of the Montana Department of Natural Resources and Conservation, which furnished the water-level data and the reservoir-contents table.

Table 9. Month-end contents for Yellowstone River Compact reservoirs existing on January 1, 1950.

Date	Usable contents, in acre-feet[2]			
	06224500 Bull Lake	Pilot Butte Reservoir	06281500 Buffalo Bill Reservoir	06307000 Tongue River Reservoir
September 30, 2006	50,540	1,020	441,100	42,720
October 31	56,100	842	433,500	46,630
November 30	57,500	721	446,700	47,670
December 31	57,800	4,930	447,200	47,150
January 31, 2006	58,100	12,400	445,300	48,190
February 28	57,800	18,600	445,100	50,790
March 31	57,700	25,400	457,700	61,440
April 30	52,400	24,300	485,600	59,000
May 31	77,500	18,000	562,500	79,500
June 30	95,200	16,000	622,100	78,360
July 31	69,700	16,700	555,100	69,880
August 31	60,500	14,700	482,500	54,440
September 30, 2007	47,000	6,120	417,800	46,890
Change in contents during water year	–3,540	5,100	–23,300	4,170

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

[2] Pre-Compact water rights and post-compact water rights for these reservoirs are presented in the table, "Water-year-end contents for Yellowstone River Compact reservoirs or lakes."

Water-Year-End Contents for Yellowstone River Compact Reservoirs[1] or Lakes

Table 10. Water-year-end contents for Yellowstone River Compact reservoirs or lakes.

[Contents are in acre-feet. Reservoirs or lakes are listed in alphabetical order by drainage basin. Symbol: --, no data or not available]

Reservoir or lake name	Pre-compact 1950 water right	Post-compact 1950 water right	Usable capacity	Usable contents on Sept. 30, 2007	Usable contents on Sept. 30, 2006	Change in usable contents
Bighorn River Basin						
(Lake) Adelaide Reservoir[2]	1,450	4,760	6,210	1,100	450	650
Anchor Reservoir[3]	17,410	0	17,410	254	233	21
Bighorn Lake[3]	--	1,116,000	1,312,000	940,700	745,800	194,900
Boysen Reservoir[3]	701,500	0	701,500	349,600	407,700	–58,100
Buffalo Bill Reservoir[3]	456,600	190,00	646,600	417,800	441,100	–23,300
Bull Lake[3]	152,000	0	152,000	47,000	50,540	–3,540
Greybull Valley Reservoir[2]	0	33,170	33,170	2,800	322	2,478
Pilot Butte Reservoir[3]	34,600	0	34,600	6,120	1,020	5,100
Sunshine Reservoir[2]	52,990	0	52,990	5,700	5,960	–260
Lower Sunshine Reservoir[2]	42,640	42,300	84,940	5,130	720	4,410
Powder River Basin						
Cloud Peak Reservoir[2]	3,400	172	3,570	185	0	185
Dull Knife Reservoir[2]	--	4,320	4,320	818	63	755
Healy Reservoir[2]	--	5,140	5,140	1,340	1,340	0
Kearney Reservoir[2]	1,850	4,470	6,320	2,900	1,080	1,820
Lake DeSmet[2]	37,520	197,500	235,000	197,500	187,300	10,200
Muddy Guard Reservoir[2]	--	2,340	2,340	500	500	0
Tie Hack Reservoir[2]	1,650	2,440	2,440	1,920	1,920	0
Willow Park Reservoir[2]	4,460	--	4,460	765	451	314
Tongue River Basin						
Bighorn Reservoir[2]	2,750	1,880	4,630	1,040	584	456
Cross Creek Reservoir	--	798	798	237	309	–72
Dome Reservoir[2,4]	1,840	188	2,030	856	1,210	–354
Granger Reservoir[2]	146	--	146	0	0	0
Last Chance Reservoir[2]	90	--	90	0	0	0
Martin Reservoir[2]	561	--	561	0	0	0
Park Reservoir[2]	7,350	3,020	10,360	3,310	3,090	220
Sawmill Lakes Reservoir[2]	--	1,280	1,280	1,060	746	314
Tongue River Reservoir[5]	79,070	--	79,070	46,890	42,720	4,170
Twin Lakes Reservoir[2,6]	1,180	2,220	3,400	2,410	2,840	–430
Weston Reservoir[2]	370	--	370	0	0	0
Willits Reservoir[2]	79	--	79	0	0	0

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

[2] Reservoirs managed by the State of Wyoming.

[3] Reservoirs managed by Bureau of Reclamation.

[4] Data are combined contents of Dome Lake and Dome Lake Reservoir.

[5] Reservoir managed by the State of Montana.

[6] Data are combined contents of Twin Lakes Number 1 and Twin Lakes Number 2.

RULES AND REGULATIONS FOR ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

A compact, known as the Yellowstone River Compact, between the States of Wyoming, Montana, and North Dakota, having become effective on October 30, 1951, upon approval of the Congress of the United States, which apportions the waters of certain interstate tributaries of the Yellowstone River which are available after the appropriative rights existing in the States of Wyoming and Montana on January 1, 1950 are supplied, and after appropriative rights to the use of necessary supplemental water are also supplied as specified in the Compact, is administered under the following rules and regulations subject to the provisions for amendment revision or abrogation as provided herein.

Article I. Collection of Water Records

A. It shall be the joint and equal responsibility of the members of the States of Wyoming and Montana to collect, cause to be collected, or otherwise furnish records of tributary streamflow at the points of measurement specified in Article V (B) of the Compact, or as near thereto as is physically or economically feasible or justified.

1. Clarks Fork

The gaging station known as Clarks Fork near Silesia, Montana and located in NW1/4 SE1/4 sec. 1, T. 4 S., R. 23 E., shall be the point of measurement for the Clarks Fork.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River above Tullock Creek, near Bighorn, Montana, and located in SE1/4 SE1/4 NE1/4 sec. 3, T. 4 N., R. 34 E., shall temporarily be the designated point of measurement on that stream. The flow of the Little Bighorn River as measured at the gaging station near Hardin, Montana, and located in SE1/4 NE1/4 NE1/4 sec. 19, T. 1 S., R. 34 E., shall be considered the point of measurement for that stream, except that if or when satisfactory records are not available, the records for the nearest upstream station with practical corrections for intervening inflow or diversion shall be used.

3. Tongue River

The gaging station known as the Tongue River at Miles City, Montana, and located in NE1/4 NE1/4 SE1/4 sec. 23, T. 7 N., R. 47 E., shall temporarily be the point of measurement for that stream.

4. Powder River

The gaging station known as the Powder River near Locate, Montana, and located in NW1/4 SW1/4 sec. 14, T. 8 N., R. 51 E., shall temporarily be the designated point of measurement for that stream.

B. Records of total annual diversion in acre-feet above the points of measurement designated in the Compact for irrigation, municipal, and industrial uses developed after January 1, 1950, shall be furnished by the members of the Commission for their respective States, at such time as the Commission deems necessary for interstate administration as provided by the terms of the Compact. Providing that if it be acceptable to the Commission, reasonable estimates thereof may be substituted.

C. Annual records of the net change in storage in all reservoirs, not excluded under Article V (E) of the Compact, above the point of measurement specified in the Compact and completed after January 1, 1950, and the annual net change in reservoirs existing prior to January 1, 1950, which is used for irrigation, municipal, and industrial purposes developed after January 1, 1950, shall be the primary responsibility of the member of the Commission in whose State such works are located; providing such data are not furnished by Federal agencies under the provisions of Article III (D) of the Compact, or collected by the Commission.

Article II. Office and Officers

A. The office of the Commission shall be located at the office of the Chairman of the Commission.

B. The Chairman of the Commission shall be the Federal representative as provided in the Compact.

C. The Secretary of the Commission shall be as provided for in Article III of these rules.

D. The credentials of each member of the Commission shall be placed on file in the office of the Commission.

Article III. Secretary

A. The Commission, subject to the approval of the Director of the United States Geological Survey, shall enter into cooperative agreements with the U.S. Geological Survey for such engineering and clerical services as may reasonably be necessary for the administration of the Compact. Said agreements shall provide that the Geological Survey shall:

1. Maintain and operate gaging stations at or near the points of measurement specified in Article V (A) of the Compact.

2. Assemble factual information on stream flow, diversion, and reservoir storage for the preparation of an annual report to the Governors of the signatory States.

3. Make such investigations and reports as may be requested by the Commission in aid of its administration of the Compact.

B. The Geological Survey shall act as Secretary to the Commission.

Article IV. Budget

A. At the annual meeting of each even-numbered year or prior thereto, the Commission shall adopt a budget for operation during the ensuing biennium beginning July first. Such budget shall set forth the total cost of construction, maintenance and operation of gaging stations, the cost of engineering and clerical aid, and other necessary expenses excepting the salaries and personal expenses of the Commissioners. On odd-numbered years revisions of the budget shall be considered.

B. It shall be the obligation of the Commissioners of the States of Montana and Wyoming to endeavor to secure from the Legislature of their respective States sufficient funds with which to meet the obligations of this Compact, except insofar as provided by the Federal government.

Article V. Meetings

An annual meeting of the Commission shall be held each November at some mutually agreeable point in the Yellowstone River Basin for consideration of the annual report for the water year ending the preceding September 30th, and for the transaction of such other business consistent with its authority; provided that by unanimous consent of the Commission the date and place of the annual meeting may be changed. Other meetings as may be deemed necessary shall be held at a time and place set by mutual agreement, for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approval by the Commissioners for the States of Wyoming and Montana.

Article VI. Amendments, Revisions and Abrogations.

The Rules and Regulations of the Commission may be amended or revised by a unanimous vote at any meeting of the Commission.

Gary Fritz
Commissioner for Montana

George L. Christopulos
Commissioner for Wyoming

ATTESTED:

L. Grady Moore
Federal Representative

Adopted November 17, 1953
Amended December 16, 1986

RULES FOR THE RESOLUTION OF DISPUTES OVER THE ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

December 19, 1995

Section I. General Framework

According to Article III(F) of the Yellowstone River Compact,

"In case of the failure of the representatives of Wyoming and Montana to unanimously agree on any matter necessary to the proper administration of this compact, then the member selected by the director of the United States Geological Survey shall have the right to vote upon the matters in disagreement and such points of disagreement shall then be decided by a majority vote of the representatives of the states of Wyoming and Montana and said member selected by the director of the United States geological survey, each being entitled to one vote."

Section II. Purpose and Goal

A. The purpose of these rules is to clarify and more fully develop the dispute resolution process outlined in Section I.

B. The goal of the dispute resolution process outlined in these rules is to encourage joint problem solving and consensus building. It consists of three phases -- unassisted negotiation, facilitation, and voting.

C. Any agreement reached through this process is binding on Montana, Wyoming, and the United States Geological Survey (USGS).

D. Either state can initiate the dispute resolution process defined in Sections IV, V, and VI, and the other state is obligated to participate in good faith. The states agree that the issues pursued under this dispute resolution process shall be both substantive and require timely resolution.

Section III. Consensus

A. In the process of administering the Yellowstone River Compact, the representatives from Montana and Wyoming agree to seek consensus.

B. For purposes of this rule, consensus is defined as an agreement that is reached by identifying the interests of Montana and Wyoming and then building an integrative solution that maximizes the satisfaction of as many of the interests as possible. The process of seeking consensus does not involve voting, but a synthesis and blending of alternative solutions.

Section IV. Unassisted Negotiation

A. In all situations, the representatives from Montana and Wyoming shall first attempt to seek consensus through unassisted negotiation. The federal representative will not serve as chairperson in the unassisted negotiation process.

B. During a negotiation process, the representatives from Montana and Wyoming shall identify issues about which they differ, educate each other about their needs and interests, generate possible resolution options, and collaboratively seek a mutually acceptable solution.

C. To help facilitate negotiations, the representatives from Montana and Wyoming in cooperation with the USGS agree to share technical information and develop joint data bases. Other data sources may also be used.

D. The USGS shall serve as technical advisor in the two-state negotiations.

Section V. Facilitation

A. If the representatives from Montana and Wyoming are not able to reach consensus through unassisted negotiation, they shall each identify, articulate, and exchange, in writing, the unresolved issues.

B. The representatives from Montana and Wyoming shall then jointly appoint a facilitator to assist in resolving the outstanding dispute. If the representatives from Montana and Wyoming cannot identify a mutually acceptable facilitator, the representative appointed by the USGS shall appoint a facilitator.

C. A facilitator, for purposes of this rule, is defined as a neutral third party that shall help the representatives from Montana and Wyoming communicate, negotiate, and reach agreements voluntarily. The facilitator is not empowered to vote or render a decision.

D. The facilitator shall assist the representatives from Montana and Wyoming in developing appropriate ground rules for each facilitated session including establishing a deadline for completion of the facilitation process, setting an appropriate agenda, identifying issues, collecting and analyzing technical information, developing options, packaging agreements, and preparing a written agreement. The facilitator reserves the right to meet privately with each representative during the facilitation process.

Section VI. Voting

A. If, and only if, the representatives from Montana and Wyoming are unable to reach consensus with the assistance of a facilitator, then a dispute may be settled by voting.

B. The representatives from Montana and Wyoming, along with the representative appointed by the director of the USGS, are each entitled to one vote.

C. If the USGS representative does not vote in accordance with Article III, then the director of the USGS will select, with concurrence from Wyoming and Montana, a neutral third party to vote.

D. If the representative appointed by the director of the USGS is not involved in the steps outlined in Sections IV and V, each state shall have the opportunity to present appropriate information to that representative. This information may be presented through both oral presentations and written documents. All information will be shared with the other state.

The representative of the USGS may also consult the facilitator referenced in Section V in an attempt to resolve any disputes.

E. The USGS shall pay the expenses of the representative appointed by the director of the USGS.

F. Points of disagreement shall be resolved by a majority vote.

Section VII. Funding

A. The USGS will pay one-half and the states of Montana and Wyoming shall each pay one-quarter of the expenses of the facilitator, which shall not exceed $10,000, unless agreed to by both states and the USGS.

Section VIII. Amendments

A. These rules may be amended or revised by a unanimous vote of the Commission.

Section IX. Execution

These rules for the resolution of disputes over the administration of the Yellowstone River Compact are hereby executed on the date indicated below.

Gary Fritz
Commissioner for Montana

Gordon W. Fassett
Commissioner for Wyoming

William F. Horak
Federal Representative

July 22, 1996
Date

RULES FOR ADJUDICATING WATER RIGHTS ON INTERSTATE DITCHES

Article I. Purpose

The purpose of this rule is to determine and adjudicate, in accordance with the laws of Montana and Wyoming, those pre-Compact (January 1, 1950) water rights diverting from the Powder, Tongue, Bighorn and Clarks Fork Rivers and their tributaries where the point of diversion is in one State and the place of use is in the other State which have not yet been adjudicated.

Article II. Authority

In accordance with the Yellowstone River Compact, the State of Montana and the State of Wyoming, being moved by consideration of interstate comity, desire to remove all causes of present and future controversy between the States and between persons in one State and persons in another State with respect to these interstate ditches. Article III (E) of the Compact provides the Yellowstone River Compact Commission with the authority "...to formulate rules and regulations and to perform any act which they may find necessary to carry out the provisions of this Compact...."

Article III. Definitions

The terms defined in the Yellowstone River Compact apply as well as the following definitions:

1. "Acre-feet" means the volume of water that would cover 1 acre of land to a depth of 1 foot.

2. "Cfs" means a flow of water equivalent to a volume of 1 cubic foot that passes a point in 1 second of time and is equal to 40 miners inches in Montana.

3. "Interstate Ditches" shall include ditches and canals which convey waters of the Bighorn, Tongue, Powder, and Clarks Fork Rivers and their tributaries across the Wyoming-Montana State line where the water is diverted in one State and the place of use is in the other State.

4. "Department of Natural Resources and Conservation," hereafter called the "Department," means the administrative agency and Department of the Executive Branch of the Government of Montana created under Title II, Chapter 15, MCA which has the responsibility for water administration in that State.

5. "Water Court" means a Montana District Court presided over by a water judge, as provided for in Title III, Chapter 7, MCA.

6. "State Engineer" shall be the current holder of the position created by the Wyoming Constitution as Chief Water Administration Official for the State of Wyoming.

7. "Board of Control," hereinafter called the "Board," is defined as the constitutionally created water management agency in Wyoming composed of the four Water Division Superintendents and the State Engineer.

8. "Superintendent" is the member of the Board who is the water administration official for the Water Division where the interstate ditch is located. (The two Water Divisions in the Yellowstone River drainage are Water Division Numbers Two and Three.)

9. "Date of Priority" shall mean the earliest date of actual beneficial use of water, unless evidence and circumstances pertaining to a particular claim establish an earlier date.

10. "Point of Diversion" is defined to be the legal land description by legal subdivision, section, township, and range of the location of the diversion structure for an interstate ditch from a natural stream channel.

11. "Place of Use" is defined to be the legal land description (legal subdivision, section, township, and range) of the lands irrigated by an interstate ditch.

12. "Person" is defined as an individual, a partnership, a corporation, a municipality or any other legal entity, public or private.

13. "Claimant" is defined as any person claiming the use of water from an interstate ditch as herein defined.

Article IV. Procedures

The procedures for determining and adjudicating water rights associated with interstate ditches shall be categorized as follows: (A) Where the point of diversion is in Wyoming and place of use in Montana, and (B) Where the point of diversion is in Montana and place of use in Wyoming.

A. Wyoming Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim. (A sample form for this purpose is attached.)

2. The Yellowstone River Compact Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone Compact Commission, which, when found to be correct and complete, will be forwarded to the Board for verification.

4. Upon receipt of the form, the Board shall forward it to the appropriate Superintendent, who, in cooperation with the Department, will validate the information including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The Superintendent and the Department will utilize aerial photography and other information to have prepared a reproducible map showing the location of the ditch system, lands irrigated, point of diversion, etc., of the claim.

5. After the validation procedure, the Superintendent will hold a hearing, after appropriate notice and advertisement, at which time the claimant shall describe, in detail, the use that has been made of the water and the lands that are being irrigated, establish a priority date, etc. Costs incurred in advertising shall be paid by the claimant. If a single hearing is held to consider several claims, the costs of advertising shall be shared equally among the claimants. Anyone who opposes the claim shall appear and state the reasons, if any, for opposition to the claim. If there is no opposition to the claim, cost incurred in holding the hearing shall be paid by the claimant. If protestants do appear and oppose the claim, hearing costs will be paid 50 percent by the claimant and 50 percent by the protestant, or if there is more than one protestant, the remaining 50 percent shall be shared equally among the protestants.

6. At the conclusion of the hearing, the Superintendent shall forward the record to the Yellowstone River Compact Commission with his findings and recommendations. The Yellowstone River Compact Commission will make the

determination of the amount of the right, the location, and the priority date, and then send the record to the Board.

7. The Board shall review the record and integrate it into its water rights system. Upon entry of the record by the Board, the information shall be forwarded to the Department and the Chairman of the Yellowstone River Compact Commission.

8. Upon the entry of the right into the Board's records, it will have the following attributes:

   a. The right will be a Wyoming water right with a priority date as established by this procedure.

   b. The amount of the right will be determined as provided by Wyoming law.

B. Montana Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim.

2. The Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone River Compact Commission, which, when found to be correct and complete, will be forwarded to the Department for verification.

4. Upon receipt of the form, the Department, in cooperation with the Wyoming State Engineer's Office, will validate the information, including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The appropriate Superintendent and the Department will utilize aerial photographs and other information to have prepared a reproducible map showing the location of the ditch system, land irrigated, point of diversion, etc., of the claim.

5. The Department will then forward the record to the Yellowstone River Compact Commission with its findings and recommendations. Upon approval by the Commission, the record shall be submitted to the Montana Water Court for adjudication. A duplicate record will be forwarded to the Wyoming State Engineer's Office, the Board, and the Chairman of the Yellowstone River Compact Commission upon adjudication.

6. Upon adjudication of the right by the Montana Water Court, it will have the following attributes:

   a) The right will be a Montana water right with a priority date as established by this procedure.

   b) The amount of the right will be determined as provided by Montana law.

Article V. Exclusions

A. These rules recognize the limitation in Article VI of the Yellowstone River Compact regarding Indian water rights.

B. These rules shall not be construed to determine or interpret the rights of the States of Wyoming and Montana to the waters of the Little Bighorn River.

Article VI. Claim Form Submission Period

All claims must be submitted to the Yellowstone River Compact Commission, c/o District Chief, United States Geological Survey, 821 E. Interstate, Bismarck, ND 58501, within 90 calendar days after the claimant has received the claim form from the Commission. The blank claim form will be sent certified mail to the water user and the submission period of 90 calendar days will begin with the next day following receipt of the form, as evidenced by the certified mail receipt card. For good cause shown in writing, an extension of time beyond the 90 days for submittal may be obtained from the Commission.

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING

GORDON W. FASSETT
STATE ENGINEER
HERSCHLER BUILDING
4TH FLOOR EAST
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UNITED STATES

WILLIAM F. HORAK
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821 E. INTERSTATE AVENUE
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MONTANA

GARY FRITZ
ADMINISTRATOR, WATER RESOURCES DIVISION
DEPT. OF NATURAL RESOURCES & CONSERVATION
1520 EAST SIXTH AVENUE
HELENA, MONTANA 59620
(406) 444-6603

YELLOWSTONE RIVER COMPACT COMMISSION

CLAIM FORM FOR INTERSTATE DITCHES

1. Name of ditch or canal: _____

2. Source of water supply: _____

   Tributary of _____

3. Name of claimant: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

4. Person completing form: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

5. Method of irrigation: _____

6. Point of diversion: County _____ State _____

   Headgate located in the ___¼ ___¼, Section ____, T.___R.____

   (a) Description of headgate: (Briefly describe the materials and general features, date constructed or last known work, general condition.) _____

   _____

   _____

(b) Describe water measuring device: _____

_____

_____

(c) If the point of diversion is in Montana:

1. What flow rate has been claimed?

_____ ☐ cubic feet per second

☐ gallons per minute

☐ miner's inches

2. What volume of water has been claimed?

_____ acre-feet

7. Dimensions of ditch at headgate: Width at top (at waterline) _____ feet; width at bottom _____ feet; side slopes (vertical:horizontal) _____:_____; depth of water _____ feet; grade _____ feet per mile.

8. Place of use and acres irrigated: County_____ State ____ Give legal subdivisions of land owned by you on which water is being used (acres claimed): An example field is shown in the first line.

T.	R.	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	MW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
58N	95W	18			25.1											10.2			35.3

9. Describe any additional uses of water claimed from the ditch: _____

10. Date of first beneficial use of water (priority date) on lands described above for _____ Ditch is_____ (mo/day/yr) and shall be the same for all lands claimed on this form.

11. Has irrigation water been diverted onto all lands shown in the above tabulation each year since completion of works?__ If not, state exceptions and reasons therefore: _____

_____

_____

12. Attach documentary evidence or affidavits showing your ownership or control of the above lands, as well as the historic use of water on these lands. _____

_____

_____

13. What permit or claim numbers have been assigned to known records filed with either the Wyoming State Engineer's Office or the Montana Department (DNRC) for irrigating the above lands? _____

_____

_____

14. Have personnel in the Wyoming State Engineer's Office or the Montana Department (DNRC) been contacted to obtain the information given in No. 13? ( ) Yes ( ) No

15. Describe any flumes or pipelines in the ditch conveyance system:_____

_____

_____

16. Describe ordinary annual period of use: _____ to _____
(mo/day) (mo/day)

_____.

17. Attach copies of aerial photographs, U. S. Geological Survey maps or other such documents showing the ditch and lands irrigated that give evidence to this claim and may be useful to the Commission.

* * * * * * * * * *

State of _____)
) SS
State of _____)

I, _____, having been duly sworn, depose and say that I, being of legal age and being the claimant of this claim for a water right, and the person whose name is signed to it as the claimant, know the contents of this claim and the matters and things stated there are correct.

_____

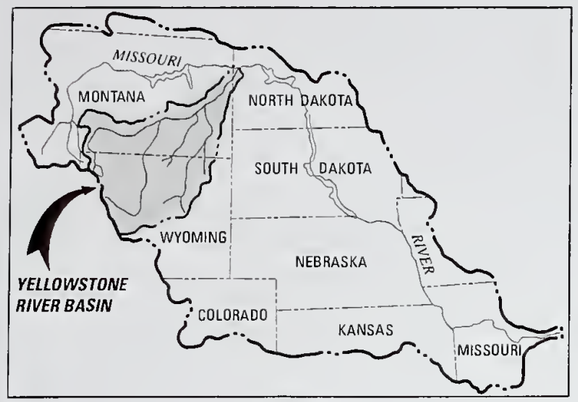
_____

Subscribed and sworn before me, this ____day of _____, 19__.

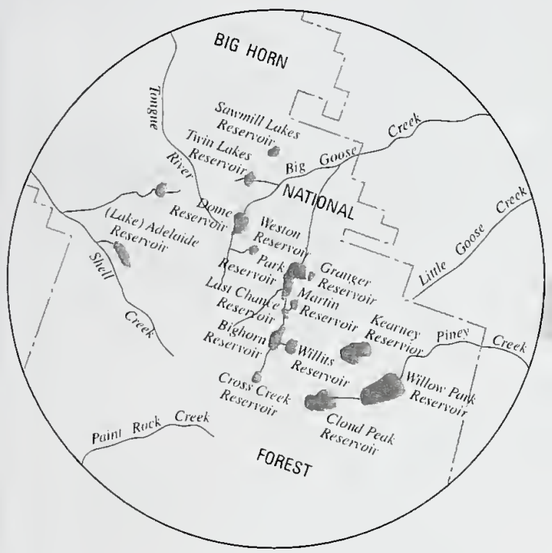
_____
Notary Public

Residing at: _____

My commission expires: _____



LOCATION MAP



YELLOWSTONE RIVER COMPACT COMMISSION

YELLOWSTONE RIVER BASIN

EXPLANATION

▲ COMPACT STREAMFLOW-GAGING STATION

◧ COMPACT RESERVOIR-CONTENT STATION

06260300 STATION NUMBER

0 10 20 30 40 MILES

0 10 20 30 40 KILOMETERS

LOCATIONS OF YELLOWSTONE RIVER COMPACT STREAMFLOW-GAGING AND RESERVOIR-CONTENT STATIONS